

A REVISION OF THE NORTH AMERICAN ICHNEUMON-  
FLIES, BELONGING TO THE SUBFAMILIES NEONEURI-  
NAE AND MICROGASTERINAE.

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INTRODUCTION.

This paper is a contribution from the Gipsy Moth and Brown-tail Moth Branch of the Bureau of Entomology. It includes tables of the known genera of the braconid subfamilies, *Neoneurinae* and *Microgasterinae*, keys to the North American species, descriptions of new species, and synonymical notes, also figures of the fore wing of representative species of the North American genera known to me.

The two subfamilies are incorporated in this paper, for the reason that one or both of the genera, *Neoneurus* Haliday and *Elasmosoma* Ruthe, which constitute the subfamily *Neoneurinae*, have been quite generally placed in the *Microgasterinae*. This despite the recognition by most workers in the Braconidae that both genera differ very widely in many important respects from typical *Microgasterinae*. Foerster<sup>1</sup> mentioned neither *Neoneurus* nor *Elasmosoma*, but included in the *Microgasterinae* a new genus, *Ecclites*, which Ashmead<sup>2</sup> synonymized with *Neoneurus* Haliday. In his key to the Microgasterides Marshall<sup>3</sup> included *Elasmosoma*; *Neoneurus*, however, he placed in the Agathides. It will be recalled that Marshall regarded these two groups as tribes of his division Areolaires. Ashmead<sup>2</sup> was apparently the first to recognize the close relationship of *Neoneurus* and *Elasmosoma*. In suggesting that the *Microgasterinae* might be susceptible of tribal division, he indicated that under such an arrangement these two genera would fall together. A few years later Szepliget<sup>4</sup> again separated the two, holding *Elasmosoma* in the *Microgasterinae*, because of its incomplete radial cell, and placing *Neoneurus* in the *Agathidinae*, now the *Braconinae*. Furthermore he stated<sup>5</sup>

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<sup>1</sup> Verh. der naturh. ver. preuss. Rheinl., vol. 19, 1862, p. 244.

<sup>2</sup> Proc. U. S. Nat. Mus., vol. 23, 1900, p. 130.

<sup>3</sup> In Andre, Species Hym. Europe et Alg., vol. 4, 1888, p. 389.

<sup>4</sup> Gen. Ins., fasc. 22, 1904, p. 102.

<sup>5</sup> Idem, p. 118.

that in his opinion *Plumarius* Philippi was identical with *Neoneurus* Haliday. Ashmead had placed *Plumarius* in the *Microgasterinae*, near *Neoneurus*, but evidently did not regard it as very similar to this genus. Recently Bengtsson<sup>6</sup> has published an admirable paper, in which he has clearly defined the genera *Neoneurus* and *Elasmosoma*, has shown beyond dispute their intimate relationship, both structurally and biologically, and has erected for them the subfamily *Neoneurinae*. This author points out that Ashmead was undoubtedly wrong in placing *Eccletes* Foerster in synonymy with *Neoneurus*, for Foerster described *Eccletes* as possessing only two cubital cells in the fore wing, while *Neoneurus* has three.

In a consideration of the genera constituting the *Neoneurinae* and the *Microgasterinae*, *Plumarius* can now be disregarded. Recently Dr. J. C. Bradley of Cornell University, on an examination of Philippi's type, found that it is not an ichneumonoid; he will undoubtedly shortly define its systematic position;<sup>7</sup> *Eccletes* Foerster certainly can not be considered a microgasterine genus, and in all probability is not neoneurine. Its position is very doubtful; but I am inclined at present to place it in the *Blacinae*. *Neoneurus* Haliday and *Elasmosoma* Ruthe will make up the *Neoneurinae*; while the *Microgasterinae* will comprise the following genera: *Oligoneurus* Szepligeti, *Mesocoelus* Schultz, *Mirax* Haliday, *Adelius* Haliday, *Dirrhope* Foerster, *Apanteles* Foerster, *Microgaster* Latreille and *Microplitis* Foerster.

The genera *Neoneurus*, *Oligoneurus*, and *Dirrhope*, none of which has yet been discovered in North America, and *Mesocoelus* Schultz, the only known specimen of which was taken on the Island of St. Vincent and is in the British Museum, are known to me only from literature. I have, however, had the opportunity of examining a very large part of the type material of the North American species contained in the remaining genera, most of which is in the United States National Museum. Only the types of the following have not been seen: Of *Microplitis tuckeri* Viereck, which is in the collection of Kansas University; of Provancher's two species of *Microplitis* and four of *Microgaster* which are in the Museum of Public Instruction in Quebec, Canada; of *Microgaster zonaria* Say and *M. calliptera* Say which have been lost; and of *Microplitis coactus* Lundbeck which is probably in some European collection.

Say's two species were sufficiently well characterized in the original description to make their recognition comparatively easy. In

<sup>6</sup> Lund. Univ. Arsskr. N. F. Avd. 2, vol. 14, No. 32, 1918, pp. 1-47.

<sup>7</sup> In an address before the Biological Society of Washington, the abstract of which was published in 1921 (Journ. Wash. Acad. Sci., vol. 11, No. 9, p. 214), Doctor Bradley said that *Plumarius* belongs to the family Mutillidae and has the genus *Konowiella* André as a synonym.

placing *Microplitis tuckeri* Viereck and Provancher's species I have been greatly aided by notes kindly loaned me by Mr. A. B. Gahan, which were made by himself on an examination of the types of these species several years ago.

At this point I wish to thank Mr. A. F. Burgess, in charge of the gipsy moth and brown-tail moth investigations, for making possible the preparation of this paper. I desire also to gratefully acknowledge many helpful suggestions and criticisms on the part of Messrs. Gahan and Rohwer, of the Bureau of Entomology.

#### CLASSIFICATION.

### Superfamily ICHNEUMONOIDEA.

#### Family BRACONIDAE.

#### Subfamily NEONEURINAE.

*Neoneurinae* BENGTSSON, Lunds. Univ. Arsskr. N. F. Avd. 2, vol. 14, No. 32, 1918, p. 46.

Following is a translation of Bengtsson's characterization of this group:

Head broad, short viewed from in front; thorax at least as broad as head, transverse; vertex short; vertex, temples and cheeks im-margined; occiput not at all excavated; clypeus truncate anteriorly; labrum prominent, the apex rotundate; eyes smooth; antennae shorter than body, with 13 to 16 segments, the segments distinct; mandibles narrow, crossing at apex, bidentate; palpi very short, concealed, the maxillary 2-segmented, the labial 1-segmented; thorax thick; mesonotum broad, convex, abruptly declivous in front; notauli wanting or weakly indicated. Anterior wings with stigma large, broadly ovate, provided with a slight extension apically, and emitting radius a little before its middle; radius with 3 abscissae, the 1st and 2d very short; radial cell very short, narrow, remote from apex of wing; 3 cubital cells, the 2d small, a little longer than broad, trapezoidal; brachial cell lengthened, acuminate, open, almost twice as long as discoidal; veins often inconspicuous or partly obsolete. Posterior wings with radial cell not divided, discoidal cell wanting, nervellus wanting or not at all distinct. Legs subequal, the posterior pair slightly longer and thicker, tibial spurs long, tarsal claws minute, anterior tarsi of female with greatly elongated pulvilli. Abdomen narrow, sublinear, sessile, flat above, with eight distinct segments, valvula ventralis of female not elongate; ovipositor very short, hardly exerted. Body small, 2 to 4 mm. long.

The *Neoneurinae* differ most strikingly from the *Microgasterinae* in the exceedingly short palpi; the long, slender tarsi, with very

minute, usually indistinct, tarsal claws; the smooth eyes; the narrow radial cell, the third abscissa of radius being parallel with the outer margin of stigma; the subquadrate second cubital cell; and the very short thickened metacarpus.

Bengtsson, in the article cited above, gives a concise summary of the published information regarding the biology and habits of members of this group. It appears to have been conclusively shown that the known species pass the larval period as internal parasites of ants. This unusual habit itself will at once set them apart from the *Microgasterinae*, which are evidently exclusively parasitic on lepidopterous larvae.

KEY OF THE GENERA OF NEONEURINAE.

- Radial cell complete, the radius distinct to the wing-margin; antennae 16-segmented, and but little shorter than body----- *Neoneurus* Haliday.  
 Radial cell incomplete, the last abscissa of radius mostly obsolete; antennae 13-segmented in the female, 14 in the male, and very short; porrect, shorter than head and thorax united----- *Elasmosoma* Ruthe.

Genus NEONEURUS Haliday.

*Neoneurus* HALIDAY, Ent. Mag., vol. 5, 1838, p. 213.—SNELLEN VAN VOLLENHOVEN, Schetsen, vol. 2, 1869, pl. 6.—MARSHALL, in André, Hym. Eur. et Alg., vol. 5bis, 1897, p. 197, pl. 10, fig. 3.—ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 130.—SZEPLIGETI, Gen. Ins., fasc. 22, 1904, p. 118.—BENGTSSON, Lund. Univ. Arsskr. N. F. Avd. 2, vol. 14, 1918, pp. 1-47. *Genotype*.—*Neoneurus halidaii* Marshall (Monobasic).

Head large, transverse, as broad as thorax; maxillary palpi 2-segmented, labial 1-segmented; eyes large but not prominent, bare, converging in female; occiput convex; antennae of both sexes slender, as long as the body nearly, 16-segmented; parapsidal grooves weakly indicated; scutellum separated from mesoscutum by a transverse sulcus; anterior wing with a very short complete radial cell, which is divided by a more or less distinct cross-vein; three cubital cells, the second small, subquadrate; recurrent vein indistinct or incomplete, the five-sided discoidal cell open outwardly; legs slender; the posterior trochanters small, almost indistinct; spurs of posterior tibiae half as long as the metatarsus; tarsal claws minute; abdomen sessile, flat and finely shagreened above, keeled below.

Morley<sup>8</sup> was beyond all doubt mistaken in identifying *Neoneurus halidaii* Marshall with *Elasmosoma berlinense* Ruthe. Marshall's characterization and figure show conclusively that the genotype of *Neoneurus* is distinct from that of *Elasmosoma*.

No representative of this interesting genus has yet been discovered in North America; but it is not at all unlikely that further collecting in the immediate vicinity of ants' nests will produce it.

<sup>8</sup> Ent. Mag., vol. 59, 1914, p. 16.



## Genus ELASMOSOMA Ruthe.

*Elasmosoma* RUTHE, Berlin. Ent. Zeitschr., vol. 2, 1858, p. 7.—MARSHALL, in André, Spec. Hym. Europe, vol. 4, 1888-1890, pp. 389, 549.—ASHMEAD, Proc. Ent. Soc. Wash., vol. 3, 1895, p. 280; Proc. U. S. Nat. Mus., vol. 23, 1900, p. 131.—SZEPLIGETI, Gen. Ins., fasc. 22, 1904, p. 104.—BENGTSSON, Lund. Univ. Arsskr. N. F. Avd. 2, vol. 14, 1918, pp. 1-47. *Genotype*.—*Elasmosoma berlinense* Ruthe (Monobasic).

*Paramirax* ASHMEAD, Proc. Ent. Soc. Wash., vol. 3, 1895, p. 281. *Genotype*.—(*P. schwarzi* Ashmead)=*Elasmosoma schwarzi* Ashmead (Monobasic).

Head transverse; maxillary palpi 2-segmented, labial 1-segmented; eyes very large, bare; antennae very short and straight, shorter than head and thorax united, 13-segmented in female, 14-segmented in male; mesoscutum without parapsidal furrows; propodeum abruptly declivous; radius with three abscissae, the third mostly obsolete; the radial cell very narrow, open; three cubital cells, the second subquadrate; intercubital veins and cubitus very indistinct; first discoidal cell with very long petiole, and open outwardly, the recurrent vein being absent or very indistinct; inner spur of posterior tibiae nearly as long as metatarsus; tarsi long and slender, tapering gradually toward apex; tarsal claws exceedingly minute, indistinct; abdomen sessile, flat, and minutely shagreened above, rather sharply margined laterally, and with a pronounced ventral keel; hypopygium of female broad and peculiarly bifurcate.

This genus is represented in North America by four species. While no definite host records are available for any of these, all have been taken near ants' nests; and, in view of the observations on the habits of European species, it seems safe to assume that they are parasitic upon ants. All four species appear to be exceedingly uncommon. I have seen not more than four specimens of any of them.

## KEY TO THE NORTH AMERICAN SPECIES OF ELASMOSOMA.

1. Abdomen long, slender, about twice as long as head and thorax united, strongly compressed, although flat above; legs including all coxae pale yellow..... 1. *schwarzi* Ashmead.  
Abdomen much shorter, but little, or not at all, longer than head and thorax combined, and not so narrow and strongly compressed..... 2.
2. Wings distinctly somewhat fuliginous..... 2. *pergandei* Ashmead.  
Wings whitish hyaline..... 3.
3. Legs, including all coxae, pale yellow; eyes strongly convergent below, the face at base of clypeus much narrower than long down the middle; spiracles of first abdominal segment not prominent... 3. *vigilans* Cockerell.  
Middle and posterior coxae blackish; eyes not so convergent below, the face at base of clypeus at least as broad as long down the middle; spiracles of first abdominal segment prominent..... 4. *bakeri* Ashmead.

## 1. ELASMOSOMA SCHWARZI Ashmead.

*Elasmosoma schwarzi* ASHMEAD, Proc. Ent. Soc. Wash., vol. 3, 1895, p. 283.

*Type*.—In the United States National Museum.

This species is at once distinguished from the other known North American forms by the very long and slender abdomen.

Besides the type which was taken at Washington, District of Columbia, the National Collection contains one female specimen collected by Dr. J. M. Aldrich at Lafayette, Indiana, Aug. 11, 1918. No other specimens of this species are known to me.

### 2. ELASMOSOMA PERGANDEI Ashmead.

*Elasmosoma pergandei* ASHMEAD, Proc. Ent. Soc. Wash., vol. 3, 1895, p. 283.

*Type*.—In the United States National Museum.

The slightly infumated wings readily separate this species from *vigilans*, which it closely resembles.

Known only from the type, collected at Washington, District of Columbia, and one other female specimen in the National Museum labeled "Lawrence, Kansas, Geo. B. King."

### 3. ELASMOSOMA VIGILANS Cockerell.

*Elasmosoma vigilans* COCKERELL, Proc. Ent. Soc. Wash., vol. 10, 1909, p. 168.

*Type*.—In the United States National Museum.

The two female specimens in the type series are exceedingly like *bakeri* Ashmead, of which only males are known, and quite possibly may eventually prove to be that species. Cockerell, in his description of *vigilans*, erred in referring to the antennae as 12-segmented. They are 13-segmented, the last two, however, being less distinctly separated than the others.

Boulder, Colorado.

Known only from the type material.

### 4. ELASMOSOMA BAKERI Ashmead.

*Elasmosoma bakeri* ASHMEAD, Proc. Ent. Soc. Wash., vol. 3, 1895, p. 382.

*Type*.—In the United States National Museum.

As noted in the discussion of *vigilans*, I suspect that these two species are but opposite sexes of the same form. However, I hesitate to place *vigilans* in synonymy on the basis of so little material.

Fort Collins, Colorado; Mesilla, New Mexico; Falls Church, Virginia.

Besides the type specimens the National Collection contains one specimen labeled "Colo. 1228, Collection C. F. Baker;" and another labeled "Mesilla, N. Mex." I have also seen one specimen in the collection of Mr. Nathan Banks, at the Museum of Comparative Zoology, Cambridge, Massachusetts, which was taken by Mr. Banks at Falls Church, Virginia, May 30.

## Subfamily MICROGASTERINAE.

*Microgasteroidae* FOERSTER, Verh. der naturh. Ver. preuss. Rheinl. und Westph., vol. 19, 1862, p. 244.

*Microgasterides* MARSHALL, Trans. London Ent. Soc., 1885, p. 151.

*Microgasterinae* CRESSON, Synopsis Hymen. N. Amer., 1887, pp. 55, 59.

*Microgasteridae* MARSHALL, in André, Species Hymen. Europe, vol. 4, 1888, p. 439.

*Microgasterinae* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1898, p. 165.—Proc. U. S. Nat. Mus., vol. 23, 1900, p. 130.—SZEPLIGETI, in Wytzman's Genera Insectorum, fasc. 22, 1904, p. 102.

*Microgasterides* LYLE, The Entomologist, vol. 49, 1916, p. 122.

Head transverse, the occiput usually immargined; clypeus not emarginate; palpi never so short as in the *Neoneurinae*, and always with more segments; antennae variable, but usually the number of segments is constant for each genus; eyes usually hairy; thorax stout; parapsidal grooves usually wanting; radius of fore wing wanting or abbreviated, never complete, the radial cell being always open and never very narrow; second cubital cell small, triangular, often confluent with third cubital cell; legs normal; the spurs of the posterior tibiae variable, very short to very long, but constant within the species; tarsal claws always distinct; abdomen sessile; ovipositor varying from sub-exserted to longer than the abdomen.

Most known species of *Microgasterinae* are properly placed in this subfamily without difficulty. However, species of the more or less aberrant genera, *Adelius*, *Mirax*, *Mesocoelus*, and *Oligoneurus*, none of which contains more than a few described forms, are sometimes erroneously referred to other groups. The most dependable characters for distinguishing the *Microgasterinae* are found in the wings—the more or less abbreviated radius, the rather full radial cell, and the small or wanting second cubital cell. These characters combined with those noted above will suffice to distinguish between members of this and allied groups.

Foerster originally included eight genera in what he called the *Microgasteroidae*. Six of these, *Adelius*, *Dirrhope*, *Mirax*, *Apanteles*, *Microplitis*, and *Microgaster*, are still retained in the subfamily as we limit it to-day. The other two genera, *Eccletes* and *Cardiochiles*, have been excluded because of the possession of a complete radial cell. As indicated above, *Eccletes* may be long to the *Blacinae*; *Cardiochiles* at present constitutes a separate subfamily.

*Mesocoelus*, *Mirax*, and *Adelius* contain very few species and none of these species is well represented in any known collection. *Apanteles*, *Microplitis*, and *Microgaster*, which together constitute the genus *Microgaster* as understood by Latreille, are very well represented in our fauna, and many of the species are exceedingly common and generally well known. These three genera make up a single natural group, differing markedly from the remaining genera of the subfamily and clearly merging into one another. The only justification for holding them distinct is the greater ease with which they can thus be handled by the systematist. Including more than two hundred described North American species, the group would be quite

unwieldy; accordingly it seems desirable to recognize the artificial division into three genera. Within each of these three groups many species can be determined only with the greatest difficulty. Because of the considerable variation of specific characters it is always very desirable to have a series of several specimens. Odd collected specimens, particularly if they be males, must frequently be placed with some reservation; this applies especially to *Apanteles*.

The subfamily *Microgasterinae* contains many useful species. All that have been reared are parasitic on lepidopterous larvae, and many are exceedingly important agents in the control of injurious species. This is particularly true of numerous species of *Apanteles*, as was pointed out in the publication to which reference has been made above.

The genus *Apanteles* has been omitted from this paper, except for the description of four new species and brief synonymical notes. For a treatment of this group the reader is referred to my recent Revision of the North American Species of *Apanteles*.<sup>9</sup>

KEY OF THE GENERA OF MICROGASTERINAE.

1. Anterior wings with the median and submedian cells of equal length; both intercubital veins wanting, hence only one cubital cell present; antennae with 24, or more, segments..... 2.
- Anterior wings with the submedian cell distinctly longer than the median; at least the first intercubitus present; antennae always with less than 24 segments..... 3.
2. Antennae 23-segmented; mesoscutum normal, without a fovea on the disk. *Oligoneurus* Szepligetl.  
Antennae 24-segmented; mesoscutum with a rounded fovea on the disk. *Mesocoelus* Schulz.
3. First intercubitus long, attaining the stigma; radius not angled, obsolete except at extreme base..... 4.  
First intercubitus much shorter, not reaching the stigma; radius with two abscissae, the first making an almost right angle with the second, the second usually only indicated by a line of closely placed setae..... 5.
4. Antennae 14-segmented; stigma triangular, broad; radius arising from middle of stigma; second cubital cell not adjoining the first discoidal at base. *Mirax* Haliday.  
Antennae 20-segmented; stigma elongate-oval; radius arising far beyond the middle of stigma; second cubital cell adjoining the first discoidal at base..... *Adelius* Haliday.
5. Antennae 21-segmented; second abscissa of radius not entirely wanting; propodeum regularly areolated..... *Dirrhope* Foerster.  
Antennae 18-segmented; second abscissa of radius merely defined by a line of setae; propodeum not regularly areolated, at most with a median areola..... 6.
6. Second cubital cell open behind, the second intercubitus entirely wanting. *Apanteles* Foerster.  
Second cubital cell not confluent with third, the second intercubitus present, though often more or less hyaline..... 7.

<sup>9</sup> Proc. U. S. Nat. Mus., vol. 53, 1920, pp. 483-576.

7. Clypeus separated from the face by a distinct raised line; inner spur of middle tibiae as long as middle metatarsus; inner spur of posterior tibiae longer, usually much longer, than half the posterior metatarsus; mesopleurae very rarely (*rubricoxus*) with a crenulate furrow; posterior coxae half as long as the thorax; metacarpus at least as long as the stigma.

*Microgaster* Latreille.

Clypeus not separated from the face by a distinct raised line; inner spur of middle tibiae decidedly shorter than the middle metatarsus; inner spur of posterior tibiae very rarely as long as half the posterior metatarsus; mesopleurae (except in *carinatus* and *striatus*) with a distinct crenulate furrow; metacarpus rarely as long as stigma----- *Microplitis* Foerster.

#### Genus OLIGONEURUS Szepligeti.

*Oligoneurus* SZEPLIGETI, Termez. Fuzetek., vol. 25, 1902, p. 77; Genera Insectorum, fasc. 22, 1904, p. 103. *Genotype*.—*Oligoneurus concolor* Szepligeti. (Monobasic.)

The original description was as follows:

"Head transverse; eyes hairy; antennae 28-segmented; parapsidal grooves not distinct; propodeum indistinctly areolated, with a median carina; radial cell open, radius abbreviated; both intercubital veins wanting, hence only one cubital cell present; cubital and basal veins arising separately from the parastigma, the first discoidal cell sessile; second discoidal cell open; nervulus interstitial with basal vein; radial cell of hind wings wanting; legs rather stout; abdomen obovate; second abdominal segment the longest; the last ventral segment large; second suture indistinct."

This genus, based upon a single species from Brazil, has not yet been discovered in our North American fauna.

#### Genus MESOCOELUS Schulz.

*Coelothorax* ASHMEAD, Proc. U. S. Nat. Mus., vol. 4, 1898, p. 165; Trans. London Ent. Soc., 1900, p. 275. *Genotype*.—*Coelothorax laeviceps* Ashmead (Monobasic).

*Mesocoelus* SCHULZ (= *Coelothorax* ASHMEAD, preoccupied), Zool. Annal., vol. 4, 1911 (1909), p. 88.

Head transverse; occiput immargined; antennae 24-segmented; parapsidal furrows wanting; mesoscutum with a rounded fovea or depression; propodeum exareolated; mesopleurae with a furrow; median and submedian cells of equal length; the other cells entirely wanting; posterior legs long and stout, their coxae very long; abdomen sessile.

#### MESOCOELUS LAEVICEPS (Ashmead).

*Coelothorax laeviceps* ASHMEAD, Trans. London Ent. Soc., 1900, p. 276.

*Distribution*.—St. Vincent.

*Host*.—Unknown.

The unique type is in the British Museum, and the genus is known to me only from the original description.

Genus **MIRAX** Haliday.

*Mirax* HALIDAY, Entom. Mag., vol. 1, 1833, p. 263; vol. 2, 1834, p. 230.

*Genotype*.—*Mirax rufilabris* Haliday (Monobasic).

*Centistidea* ROHWER, Psyche, vol. 21, 1914, p. 81. *Genotype*.—*Centistidea ectoedemiae* Rohwer (Monobasic).

Allied to *Acoelius* Haliday, but at once distinguished by the 14-segmented antennae and the venational characters given in the key to genera, also by having a distinct embossed plate on the first abdominal tergite.

Occiput immargined; eyes indistinctly hairy; parapsidal grooves distinct anteriorly, entirely wanting posteriorly; radius obsolete, merely indicated by a line of closely-placed setae; first intercubitus attaining the stigma; first cubital cell often not completely separated from the first discoidal; spurs of posterior tibiae short; first and second abdominal tergites largely membranous, with slender embossed median plates.

KEY TO THE NORTH AMERICAN SPECIES OF **MIRAX**.

1. Vertex with a polished groove extending from the median ocellus to the occiput; basal segment of antennal flagellum not distinctly longer than the second ----- 2.
- Vertex without such a groove from the median ocellus to the occiput; basal segment of antennal flagellum decidedly longer than the second ----- 3.
2. Head and thorax testaceous; abdomen testaceous beyond second tergite; second dorsal abdominal plate very finely striate laterally.
  1. *pallida* Ashmead.  
Thorax mostly brownish-black; abdomen blackish beyond second tergite; plate on the second tergite not striate ----- 2. *lithocolletidis* Ashmead.
  3. Head, including antennae, entirely yellow; all legs and the two basal abdominal segments yellow ----- 3. *texana*, new species.  
Head black ----- 4.
  4. All coxae and femora strongly infuscated; tegulae and wing-bases brown.
    4. *aspidiscae* Ashmead.  
All coxae and femora yellow; tegulae and wing-bases pale yellow ----- 5
5. Propodeum highly polished, with several distinct longitudinal striae or rugae on either side of the median carina; length 2 mm.
  5. *ectoedemiae* (Rohwer).  
Propodeum without such striae or rugae; length hardly 1 mm.
  6. *minuta* Ashmead.

**1. MIRAX PALLIDA** Ashmead.

*Mirax pallida* ASHMEAD, Psyche, vol. 6, 1893, p. 379.

*Type*.—In the United States National Museum.

Closely allied to *lithocolletidis*, differing only as noted in the key. Jacksonville, Florida.

Known only from the unique type.

**2. MIRAX LITHOCOLLETIDIS** Ashmead.

*Mirax lithocolletidis* ASHMEAD, Psyche, vol. 6, 1893, p. 378.

*Type*.—In the United States National Museum.



Washington, District of Columbia; Jacksonville, Florida; Ithaca, New York.

The National Collection contains only the two specimens of the type series, the type from Washington, District of Columbia, and the allotype from Jacksonville, Florida. I have also seen one male and one female of this species in the Cornell University Collection, reared at Ithaca, New York, from *Lithocolletes aceriella* Clemens.

### 3. MIRAX TEXANA, new species.

Readily separated from *aspidiscæ*, to which it is apparently closely allied, by the entirely yellow head, and the reticulated propodeum.

*Male*.—Length, 1.2 mm. Head a little broader than thorax, strongly receding behind the eyes, mostly smooth and shining; antennae about as long as the body, the first flagellar segment distinctly longer than the second; vertex without a median groove from the median ocellus to the occiput; parapsidal furrows deeply impressed anteriorly, wholly wanting behind; mesoscutum and scutellum mostly smooth, with only a few weak punctures; mesopleuræ polished; propodeum reticulate with a median longitudinal carina, the interstices smooth and shining; stigma large, triangular, the first cubital and first discoidal cells broadly confluent; radius almost wholly obliterated; legs slender; posterior coxæ short; spurs of posterior tibiae very short; abdomen about as long as thorax, depressed, slender at base, broadening suddenly at apex of first segment; the embossed plate on the first tergite very slender, and narrowing to a point at apex; second tergite almost entirely membranaceous, the embossed plate being nearly reduced to a line on the anterior three-fourths; but broadening suddenly posteriorly so that it extends entirely across the tergite; entire abdomen smooth and shining. Head, including the antennae, wholly yellow; thorax brown, tegulae pale; wings hyaline, the veins and stigma pale yellow; legs, including all coxæ, yellow; abdomen pale on basal half, blackish beyond.

*Type locality*.—Texas.

*Type*.—Cat. No. 24012, U.S.N.M.

*Host*.—"Tineid."

Described from a single male specimen, apparently from Texas, reared by C. H. T. Townsend, under his number 647-49, on June 14, 1895. Ashmead's manuscript name has been adopted.

### 4. MIRAX ASPIDISCAE Ashmead.

*Mirax aspidiscæ* ASHMEAD, Psyche, vol. 6, 1893, p. 378, No. 1.

*Mirax grapholithæ* ASHMEAD, Psyche, vol. 6, 1893, p. 378, No. 4.

*Types*.—In the United States National Museum.

*Hosts*.—*Aspidisca splendoriferella* Clemens; *Grapholitha pruni-vora* Walsh.

Only the type material is known; a study of this shows conclusively, I think, that *grapholithae* and *aspidiscae* are the same species.

#### 5. MIRAX ECTOEDEMIÆ (Rohwer).

*Centistidea ectoedemiæ* ROHWER, Psyche, vol. 21, 1914, p. 81.

*Type*.—In the United States National Museum.

At once distinguished from *minuta* by the characters given in the table to species. Mr. Gahan had previously detected the synonymy of *Centistidea* with *Mirax*, and called my attention to this point. There can be no doubt whatever that *Centistidea* Rohwer is *Mirax* Haliday.

Ballston, Virginia.

*Host*.—*Ectoedemia castaneæ* Busck.

Known only from the type specimens.

#### 6. MIRAX MINUTA Ashmead.

*Mirax minuta* ASHMEAD, Psyche, vol. 6, 1893, p. 378.

*Type*.—In the United States National Museum.

Apparently the smallest of our described species.

Jacksonville, Florida.

The unique type is the only specimen known to me.

#### Genus ADELIUS Haliday.

*Adelius* HALIDAY, Entom. Mag., vol. 1, 1833, p. 262. *Genotype*.—*Adelius subfasciatus* Haliday (Monobasic).

*Acaelius* HALIDAY, Entom. Mag., vol. 2, 1834, p. 231. (Emendation.)

*Pleiomerus* (Wesmæel) RATZBURG, Ichn. v. Forstins., vol. 3, 1852, p. 65.

*Genotype*.—*Adelius subfasciatus* Haliday (Monobasic). Isogenotypic with *Adelius* Haliday.

*Acoelius* HALIDAY Foerster, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, p. 244.—MARSHALL, Trans. Ent. Soc. London, 1885, p. 153. (Emendation.)

*Anomopterus* ROHWER, Psyche, vol. 21, 1914, p. 80. *Genotype*.—*Anomopterus fasciipennis* Rohwer (Monobasic).

Haliday, in 1834, specifically said that the name *Adelius*, published the preceding year, was due to an oversight, and published the correction, *Acaelius*. This name contained a typographical error, not repeated in the index of the volume, which was subsequently corrected by Foerster. However, it seems inadvisable to accept such emendations of generic names, though long in use; and in the present paper *Adelius* is held to be the valid name for the genus. That *Anomopterus* Rohwer is *Adelius* Haliday was brought to my attention by Mr. A. B. Gahan, who had earlier noted the identity of this genus.

Head almost subquadrate, the vertex quite long and flat; eyes shortly pilose; antennae 20-segmented; occiput margined; parapsidal grooves wanting; stigma elongate-oval, not angulated; radius arising far out on stigma, greatly abbreviated; first intercalbitus attain-

ing the stigma; second cubital cell bordering the first discoidal at base; posterior coxae small; spurs of posterior tibiae short; abdomen sessile, strongly depressed; the first tergite extending at least half the length of the abdomen.

KEY TO THE NORTH AMERICAN SPECIES OF ADELIUS.

1. Anterior wings with two broad fuscous bands, one just before and another just beyond the middle..... 2.
- Anterior wings, entirely hyaline; head, mesonotum and mesopleurae testaceous, the mesopectus black..... 1. *nigripectus*, new species.
2. Head entirely, and thorax except metanotum and propodeum, ferruginous; the fuscous bands on wings dark and well-marked; head and mesonotum granular..... 2. *fasciipennis* (Rohwer).
- Head above and behind, and the thorax entirely, piceous to black; the fuscous bands on wings weak and poorly defined; head and mesonotum punctate.
  3. *coloradensis*, new species.

1. ADELIUS NIGRIPECTUS, new series.

Somewhat resembles *fasciipennis*, but is at once separated by the clear hyaline wings, darker abdomen and receding temples.

*Male*.—Length 1.4 mm. Face twice as broad as long; vertex rather long, flat, indistinctly punctate, shining; temples receding sharply behind the eyes, and like the vertex, mostly smooth and shining; antennae nearly as long as the body; mesoscutum distinctly punctate anteriorly, impunctate and indistinctly alutaceous on posterior half; scutellum flat, impunctate; mesopleurae entirely polished with a longitudinal crenulate furrow below; propodeum impunctate and strongly shining, the dorsal aspect with a polished median longitudinal furrow bounded by sharp carinae, and with two distinct lateral carinae; a prominent transverse carina separating the dorsal and posterior aspects of propodeum; metapleurae polished; stigma large, evenly rounded behind, the radius originating far out and very short; the metacarpus less than one-third as long as the stigma measured along anterior margin; legs rather stout; posterior coxae about as long as propodeum, polished; posterior tibiae very slender at base, thickening strongly toward apex; spurs of posterior tibiae a little less than half as long as the metatarsus; abdomen very strongly depressed and entirely smooth and polished; first segment longer than the remainder of the abdomen. Head, except the stemmaticum, which is black, bright testaceous; antennae yellow on the basal third, fuscous beyond; mesoscutum, disk of scutellum and pleurae ferruginous; mesopectus, lateral faces of scutellum, metanotum and propodeum black; tegulae pale; wings clear byaline; legs including all coxae yellow, except the posterior femora above, and their tibiae and tarsi, which are very slightly infuscated.

*Type locality*.—Lafayette, Indiana.

*Type*.—Cat. No. 23981, U.S.N.M.

*Host*.—Larva of poplar leaf-miner.

Described from a single specimen reared September 24, 1915, at Lafayette, Indiana, in the Bureau of Entomology, under Cage No. C1269<sup>b</sup>.

### 2. ADELIUS FASCIIPENNIS (Rohwer).

*Anomopterus fasciipennis* ROHWER, Psyché, vol. 21, 1914, p. 80.

*Type*.—In the United States National Museum.

A rather large species, mostly ferruginous, with conspicuously banded wings.

Falls Church, Virginia.

*Host*.—*Ectoedemia phloeaphaga* Busck.

Known only from the type series.

### 3. ADELIUS COLORADENSIS, new series.

Differs from *fasciipennis*, to which it is most closely allied, in its smaller size, much darker color, and in having the fuscous bands on the wings but poorly defined.

*Male*.—Length 1.3 mm. Face one and one half times as broad as long, very minutely punctate; vertex quite evenly rounded, and together with the temples and cheeks, very weakly punctate and mostly shining; antennae slender, nearly as long as the body, mesoscutum uniformly covered with closely placed separate punctures; scutellum small, flat, distinctly punctate; both mesoscutum and scutellum rather opaque; mesopleurae punctate and opaque anteriorly and below the longitudinal depression, quite polished above it; propodeum practically impunctate, strongly shining, the dorsal aspect with two indistinct median and two weak lateral carinae, the two former bounding a shallow polished median furrow; a distinct transverse carina separating the dorsal and posterior aspects of propodeum; stigma broad; the metacarpus exceedingly short, hardly one-fourth as long as the stigma; radius very short; legs somewhat thickened; the posterior coxae small, polished; spurs of posterior tibiae very short; abdomen depressed, a little narrower than thorax, smooth, subpolished; first segment about as long as the following combined. Blackish; face, clypeus, mouthparts, testaceous; antennae mostly brown; vertex and temples dark brown; stemmaticum black; thorax piceous to black; tegulae pale; wings hyaline, the anterior pair with two poorly defined pale fuscous transverse bands near the middle; legs including all coxae brown; abdomen brown.

*Type locality*.—Fort Collins, Colorado.

*Type*.—Cat. No. 23982, U.S.N.M.

Described from 1 specimen labeled "Ft. Collins, Col." and bearing Ashmead's manuscript name, *Acoelius coloradensis*.

## Genus DIRRHOPE Foerster.

*Dirrhope* FOERSTER, Verh. naturh. Ver. preuss. Rheinl., vol. 8, 1851, p. 39; and vol. 19, 1862, p. 245.—MARSHALL, in André Species Hymen. Europe, vol. 4, 1888, p. 401. *Genotype*.—*Dirrhope rufa* Foerster (Monobasic).

Antennae 21-segmented, the scape long; propodeum areolated; radius of anterior wings with two abscissae, the first forming almost a right angle with the second, the second incomplete; second intercubitus wanting; posterior tibiae thickened, truncate at apex; abdomen with five segments visible above.

Apparently most like *Apanteles*, but at once separated by the greater number of antennal segments and the rather regularly areolated propodeum. No species of this genus are known to occur in our North American fauna.

## Genus APANTELES Foerster.

*Apanteles* FOERSTER, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, p. 245. *Genotype*.—*Microgaster obscura* Nees (Monobasic).

*Cotesia* CAMERON, Mem. and Proc. Manchester Lit. and Phil. Soc., vol. 4 (ser. 4), 1891, p. 185, pl. 1, fig. 3. *Genotype*.—*Cotesia flavipes* Cameron (Monobasic).

*Pseudapanteles* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1898 (1897), p. 166. *Genotype*.—*Pseudapanteles annulicornis* Ashmead (Viereck, 1911).

*Protapanteles* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1898 (1897), p. 166. *Genotype*.—(*Protapanteles ephyrac* Ashmead)=*Apanteles palcaeritae* Riley (Viereck, 1914).

*Parapanteles* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 131. *Genotype*.—*Apanteles aletiae* Riley (Monobasic).

*Glyptapanteles* ASHMEAD, Proc. U. S. Nat. Mus., vol. 28, 1904, p. 147. *Genotype*.—*Glyptapanteles manilae* Ashmead (Monobasic).

*Cryptapanteles* VIERECK, Proc. Ent. Soc. Wash., vol. 11, 1909, p. 209 (= *Apanteles* Ashmead, Proc. Ent. Soc. Wash., vol. 4, 1898 (1897), p. 166, not Foerster). *Genotype*.—(*Apanteles emarginatus* Riley)=*Apanteles scitulus* Riley (Monobasic).

*Urogaster* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1898 (1897), p. 166. *Genotype*.—*Urogaster vulgaris* Ashmead (Viereck, 1914).

*Apanteles (Dolichogenidca)* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 173. *Genotype*.—*Apanteles (Dolichogenidca) banksi* Viereck (Monobasic).

*Stenopteura* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 187. *Genotype*.—*Apanteles sesamiae* Cameron (Monobasic).

*Allapanteles* BRETHÉS, Anales Mus. Nac. Buenos Aires, vol. 27, 1915, p. 404. *Genotype*.—*Allapanteles cecidiptae* Brethés (Monobasic).

*Cotesia* Cameron and *Allapanteles* Brethés were not included in the synonymy of *Apanteles* in my recent revision of this genus. However, there can be no doubt that they belong here. The description of *Cotesia* is obviously that of an *Apanteles* except for the statement that the antennae are 17-segmented. This was undoubtedly the result of a miscount, for the figure shows 18 distinct segments. The

description of *Allapanteles cecidiptae* Brethés, upon which the genus *Allapanteles* was based, likewise agrees absolutely with *Apanteles* Foerster.

For a key to the North American species of this genus, see Proceeding of the United States Natural Museum.<sup>10</sup> At the time that paper was prepared I had not seen the types of Cresson's four West Indian specimens *hyalinus*, *pinos*, *flaviventris*, and *marginatus*, and I accordingly placed these in my key on the basis of the original description. Recently I have examined this type material at the Philadelphia Academy of Sciences, and I find *hyalinus*, *pinos*, and *flaviventris* to fit into the places assigned them in my table to species. But *marginiventris* runs at once to *grenadensis* Ashmead, and after studying the seven specimens constituting the type series of the former, I have definitely concluded that the two names are synonymous; *grenadensis* Ashmead, then, must be suppressed.

#### APANTELES MARGINIVENTRIS (Cresson).

*Microgaster marginiventris* CRESSON, Proc. Ent. Soc. Philadelphia, vol. 4, 1865, p. 67.

*Apanteles marginiventris* CRESSON, ASHMEAD, Trans. Ent. Soc. London, 1900, p. 277.

*Apanteles grenadensis* ASHMEAD, Trans. Ent. Soc. London, 1900, pp. 277, 278.

*Apanteles (Protapanteles) harnedi* VIERECK, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 580.

*Type*.—In the Philadelphia Academy of Sciences. Cotypes of *grenadensis* and type of *harnedi* in the United States National Museum; other cotypes of *grenadensis* are in the British Museum.

This species is widely distributed through the Southern States and the West Indies.

#### APANTELES CAUDATUS, new species.

Runs to category 69, in my key to species referred to above, and is very similar to *cinctiformis* Viereck, from which it is at once separated by the darker abdomen, the longer, curved, black ovipositor sheaths of the female, and the enormous claspers of the male.

*Female*.—Length, 3.5 mm. Face broader than long, sparsely, shallowly punctate and shining; vertex, temples, and cheeks weakly punctate, strongly shining; antennae slightly shorter than the body; mesoscutum covered with minute shallow punctures, shining, almost polished posteriorly; scutellum practically impunctate and polished; mesopleurae weakly punctate anteriorly, polished, and shallowly foveate posteriorly; propodeum closely punctate, with a median longitudinal carina; stigma large, very slightly shorter than the metacarpus; radius and first intercubitus subequal in length and meeting in a rather strong angle; posterior coxae smooth and shining,

<sup>10</sup> Vol. 58, 1920, pp. 487-502.



with only a few weak punctures; inner spur of posterior tibiae half as long as the metatarsus; abdomen about as long as thorax and somewhat compressed; first dorsal abdominal plate slender, distinctly a little narrower at apex than at base, smooth and polished down the middle, punctate or weakly striate laterally; second dorsal plate subtriangular, as broad at base as long down the middle, defined laterally by oblique grooves; like the first plate, the second is mostly smooth and polished, being only slightly punctate or striate at the sides; remainder of abdomen smooth and polished; hypopygium large, but not surpassing the apex of the last dorsal abdominal segment; ovipositor sheaths at least two-thirds as long as the abdomen, broad, of nearly uniform width throughout, and strongly curved downward; the ovipositor likewise strongly curved on its apical half. Black; mandibles more or less reddish, the palpi pale; antennae black, except the pedicel, which is dark brown; tegulae pale yellow; wing-bases brown; wings hyaline or subhyaline, the costal margin and veins largely yellowish; stigma pale brown; legs entirely testaceous, except base of the posterior coxae, which is black, and the apical segments of posterior tarsi, which are slightly brownish; dorsum of abdomen black, except the broad membranous margins along the two basal plates, which are brownish-testaceous, and more or less of the sides and the apical margin of the third tergite, which are brownish; sides of venter of abdomen testaceous except at apex; ventral keel and ovipositor sheaths black.

*Male*.—Essentially as in the female; the enormous, broad claspers of the genitalia protruding more than half the length of the abdomen will readily distinguish this species from the male of any other *Apanteles* known to me.

*Type*.—Cat. No. 568, Cornell University Collection.

*Paratypes*.—Cat. No. 24330 U.S.N.M.

*Type locality*.—Carbonate, British Columbia.

*Other localities*.—Cheyenne, Wyoming; Yellowstone Lake, Montana; and Mica, Washington.

Described from the following material: One female and two male specimens collected by Dr. J. C. Bradley, at Carbonate, British Columbia, July 7-12, 1908, altitude 2,600 feet; one male specimen collected by Fanny T. Hartman at Cheyenne, Wyoming, June-August, 1907; three females collected by A. L. Melander at Mica, Washington, July 14, 1916; and one male taken by Doctor Melander at Yellowstone Lake, Montana. The female and two of the males from British Columbia and the male from Wyoming are in the Cornell University Collection; one male from British Columbia and a female from Mica, Washington, are in the United States National Museum; the remaining three specimens are in the collection of Dr. C. T. Brues, of Harvard University.

## APANTELES ALYPIAE, new species.

Runs to category 119 in my key, and falls between *depressus* and *pyralidis*. The antennae are longer than in those species, with the first four flagellar segments subequal; it differs further in having no median carina on the propodeum.

*Female*.—Length, 2 mm. Face broader than long, indistinctly punctate and strongly shining; vertex polished; temples somewhat punctate behind; antennae as long as the body, the first four flagellar segments subequal, the five apical segments much shortened; mesoscutum entirely shallowly punctate, shining; scutellar disk with very few indistinct punctures, subpolished; mesopleurae highly polished; propodeum wholly rugulose, with a more or less distinct longitudinal impression medially, and without a median carina; fore wing with radius and first intercubitus subequal in length; posterior coxae very smooth, subpolished; spurs of posterior tibiae subequal and nearly half as long as the metatarsus; abdomen ovate, the first dorsal abdominal plate with base and apex of apparently equal breadth, the sides bulging somewhat just beyond the middle, the basal half of the plate polished, the apical half rugulose; dorsal plate of the second segment transverse, the sides oblique on the basal half, parallel on posterior half, entirely finely rugulose; posterior margin of second tergite straight, or curving slightly posteriorly at the sides; third abdominal tergite much longer than the second, and like the following, smooth and polished; ovipositor sheaths subexserted. Black; antennae black, tegulae and wing-bases brownish-black; wings hyaline; venation pale brown; fore and middle legs wholly yellow; posterior coxae black except at extreme apex; remainder of posterior legs yellow, except a very small spot at extreme apex of hind femora, the apical third of hind tibiae and the hind tarsi, which are fuscous; abdomen black.

*Male*.—Essentially as in the female.

*Type locality*.—Wallingford, Connecticut.

*Type*.—Cat. No. 24025, U.S.N.M.

*Host*.—*Alypia octomaculata* Fabricius.

Described from eight female and five male specimens reared in the Bureau of Entomology, under Quaintance No. 16569, June 2-4, 1919, by B. A. Porter. Two other specimens of the same series are in the Cornell University Collection.

## APANTELES OLENIDIS, new species.

Very similar to *fiskei* Viereck, from which it differs in the black tegulae, the more shining, more weakly punctate mesonotum, the more shining hind coxae, and the somewhat stouter abdomen. Runs to *argynnidis* in my key, but has mesoscutum and scutellum much more smooth and shining. This may be a Western race of *fiskei*.

*Female*.—Length 3.2 mm. Head transverse; antennae nearly as long as body; vertex and temples smooth and shining; thorax stout; mesoscutum very strongly shining; the punctures very small, shallow, well separated; scutellum large, slightly convex, subpolished, with only a few indistinct punctures; propodeum finely rugose; transverse carinae near base of propodeum setting off two transverse areas that are smooth and shining within; mesopleurae polished, only punctured anteriorly and below; fore wing with stigma twice as long as broad; metacarpus a little longer than stigma; radius somewhat longer than transverse cubitus; posterior coxae very smooth and shining; posterior femora rather stout; inner spur of posterior tibiae slightly more than half as long as posterior metatarsus; abdomen rather stout; first abdominal tergite broadening posteriorly, much broader at apex than at base; second tergite rectangular; first and second tergites, and the third except in the posterior lateral angles, very finely closely rugulose, more finely so than in *fisheri*; remainder of dorsum of abdomen smooth and polished; hypopygium stout, but hardly exceeding apex of abdomen. Black; antennae and tegulae black; fore coxae somewhat blackish at base; posterior coxae black; wings hyaline; stigma dark brown; abdomen black, testaceous at base beneath.

*Male*.—Essentially as in female.

*Type*.—Cat. No. 24960, U.S.N.M.

*Type locality*.—Vernon, British Columbia.

*Host*.—*Olene vagans* Barnes and McDunnough.

Described from 14 female and 9 male specimens labeled as bred from *Olene vagans* by E. P. Venable. Six of the paratype specimens are in the Canadian National Collection at Ottawa; the remainder of the type material is in the United States National Museum in Washington.

APANTELES MIMORISTAE, new species.

Very similar to *aristoteliae*, agreeing in general appearance, in color, and in the length of the ovipositor. It differs from that species, however, in the first abdominal tergite, being distinctly narrower at apex than at base, in the much smoother second abdominal tergite, and in the whiter wings, with the stigma brown only in the margins.

*Female*.—Length 2.5 mm. Head transverse; face closely punctate; antennae shorter than the body; vertex closely punctate and opaque; mesoscutum very closely punctate, dull; disk of scutellum flat, punctate and opaque; mesopleurae opaque, mostly punctate; propodeum rugulose, with a rather well-defined median areola, which is smooth and shining within; costulae indistinct; inner spur of posterior tibiae more than half as long as the metatarsus; first abdominal tergite narrowing decidedly on apical third, distinctly narrower at apex than at base, closely finely ruguloso-punctate, with a longitudinal

fovea medially on the posterior half of segment; second abdominal tergite transverse, short, broader at apex than at base, more than four times as broad at apex as long down the middle, and largely smooth and shining; remainder of dorsum of abdomen smooth and polished; hypopygium large, slightly projecting; ovipositor sheaths nearly as long as the abdomen. Black; antennae, tegulae, all coxae, most of the middle femora, and hind femora entirely, black; apex of posterior tibiae, and the posterior tarsi, except at base of basal segment, blackish; wings whitish-hyaline; veins hyaline; stigma brown only in the margins; abdomen black.

*Male*.—Essentially as in the female, differing, however, in the longer antennae, and the less distinct median fovea on first abdominal tergite.

*Type*.—Cat. No. 24961, U.S.N.M.

*Type locality*.—Uvalde, Texas.

*Hosts*.—*Melitara junctolineella* Hulst, and *Mimorista flavidisimalis* Grote.

Described from four females and one male reared by J. C. Hamlin, June, 1921.

#### Genus MICROGASTER Latreille.

*Microgaster* LATREILLE, Hist. Nat. Crust. Ins., vol. 13, 1805, p. 189. *Genotype*.—*Ichneumon deprimator* Fabricius (Latreille, 1810).

*Hypoplitis* THOMSON, Opusc. Entom., pt. 20, 1895, pp. 2238, 2244. *Genotype*.—*Microgaster russata* Haliday (Viereck, 1914).

*Hypomicrogaster* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1898 (1897), p. 166; Smith's Insects N. J., 1900, p. 594. *Genotype*.—*Microgaster zonaria* Say (Monobasic).

*Protomicroplitis* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1898 (1897), p. 167. *Genotype*.—*Protomicroplitis garmani* Ashmead (Ashmead, 1900).

*Diolcogaster* ASHMEAD, Smith's Ins. New Jersey (Mar.) 1900, p. 594; Proc. U. S. Nat. Mus., vol. 23, Oct., 1900, p. 132. *Genotype*.—*Microgaster brevicauda* Provancher (Monobasic).

Head transverse; clypeus separated from face by a raised line; eyes hairy; antennae 18-segmented; mesoscutum without parapsidal furrows; mesopleurae very rarely with a crenulate furrow; stigma never longer than metacarpus; second intercubitus present, the second cubital cell complete; posterior coxae large, half as long as the thorax; spurs of middle tibiae as long as the middle metatarsus; spurs of posterior tibiae more, usually much more, than half as long as the posterior metatarsus; abdomen sessile.

This genus and the following are very closely allied, and while most species are readily placed a few are so close as to be separable only with great difficulty. However, the combination of characters given in the key to genera should suffice to distinguish between species of *Microgaster* and *Microplitis*.

Apparently most of the species of *Microgaster* are solitary parasites, always of lepidopterous larvae. The cocoons are of white silk and are never surrounded by a mass of fluffy loose silk, as is often true in the genus *Apanteles*. Although a considerable amount of material is found in most collections, few of our known species are particularly common, *Microgaster gelechia* Riley being perhaps the best known of these.

## KEY TO THE NORTH AMERICAN SPECIES OF MICROGASTER.

1. Propodeum without a distinct median longitudinal carina, very weakly roughened and usually provided with a more or less distinct areola; second abdominal tergite much shorter than the third, transverse, defined laterally by oblique grooves, and mostly smooth and shining; ovipositor sheaths more than half as long as the abdomen; second cubital cell minute, often indistinct..... 2.  
Propodeum always with a prominent median carina and usually coarsely rugose..... 3.
2. Posterior coxae, femora and tibiae wholly testaceous; second and third abdominal tergites testaceous..... 1. *zonaria* Say.  
Posterior coxae deep black on basal half; posterior tibiae with the apical third blackish; second abdominal tergite black.  
2. *ecdytolophae*, new species.
3. First dorsal abdominal plate long and narrow, at least three times as long as broad at apex, never broader at apex than at base; the second abdominal tergite mostly smooth and polished..... 4.  
First dorsal abdominal plate never so long and slender; second abdominal tergite usually rugose..... 9.
4. Second dorsal abdominal plate deeply and angularly emarginate anteriorly to receive the plate of the first tergite, and without longitudinal impressed lines medially; the first plate narrowest in the middle, the sides curving inward. Length 4 mm. or more..... 5.  
Second dorsal abdominal plate not emarginate anteriorly, and provided with two longitudinal impressed lines medially; first dorsal abdominal plate narrowest at apex. Length not over 2.5 mm..... 7.
5. Wings hyaline; all coxae and femora black; abdomen mostly black.  
3. *garmani* (Ashmead).  
Wings maculated; all coxae and femora reddish-testaceous; abdomen mostly red..... 6.
6. Head and thorax, except propodeum, testaceous..... 4. *mediata* Cresson.  
Head and thorax entirely black..... 5. *calliptera* Say.
7. All coxae entirely pale yellow; mesoscutum and scutellum with distinct separate punctures..... 6. *iridescens* Cresson.  
Posterior coxae black; mesoscutum and scutellum coarsely confluent punctate..... 8.
8. Posterior femora black; second cubital cell exceedingly minute, indistinct; median area on second abdominal tergite minutely shagreened.  
7. *xanthaspis* (Ashmead).  
Posterior femora blackish only on apical third or half; second cubital cell normal, the second intercubitus distinct; median area on second abdominal tergite polished..... 8. *bakeri*, new species.

9. Second abdominal tergite provided with two longitudinal furrows medially; scutellum always sculptured, ovipositor sheaths hardly protruding—10. Second abdominal tergite uniformly rugose, without such longitudinal furrows medially; scutellum smooth, usually polished; ovipositor sheaths usually projecting at least half the length of the abdomen—13.
10. Propodeum and the two basal abdominal tergites smooth and shining, with only a few weak scattered punctures; third tergite wholly smooth and polished; mesoscutum and scutellum with distinct separate punctures, and shining—9. *schizurae*, new species. Propodeum and the two basal abdominal tergites, with usually part of the third, rugulose or closely punctate; mesoscutum and scutellum usually confluent punctate and opaque—11.
11. Part of the second abdominal tergite and the following tergites almost entirely, reddish-testaceous; stigma yellow, somewhat paler at base; all coxae wholly testaceous—10. *auripes* Provancher. Dorsum of abdomen mostly black; if partly testaceous posterior coxae are black on basal half—12.
12. Posterior coxae wholly reddish-testaceous; longitudinal grooves on second abdominal tergite parallel and very close together, inclosing an exceedingly slender embossed area, which is scarcely more than a carina; dorsum of abdomen black—11. *brevicauda* Provancher. Posterior coxae black on basal half; the longitudinal grooves on second tergite widely separated at base of tergite, converging posteriorly. 12. *facetosa* Weed.
13. Propodeum horizontal, not declivous; mesopleurae with a very narrow, finely crenulate longitudinal furrow; apical segment of tarsi very large; inner spur of middle tibiae hardly as long as middle metatarsus; all coxae reddish-testaceous; length about 5 mm.—13. *rubricoxa* Provancher. Propodeum always strongly declivous; mesopleurae never with a crenulate furrow; inner spur of middle tibiae distinctly at least as long as middle metatarsus—14.
14. The fore and middle coxae, and at least the apex of posterior coxae, testaceous; or, if all coxae are brownish-black (rarely, in *brittoni* Viereck), then the venter of abdomen and most of the dorsum beyond second tergite are bright testaceous; tegulae nearly always yellow—15. All coxae black, rarely apex of all coxae testaceous; dorsum of abdomen, and usually the venter, black; tegulae usually black—19.
15. Face with distinct, separate, large punctures, not rugulose; third abdominal tergite wholly smooth; posterior femora short, hardly longer than hind coxae; all coxae and most of the dorsum of abdomen beyond second tergite, testaceous; ovipositor sheaths projecting much less than half the length of the abdomen—14. *melligaster* Provancher. Face finely ruguloso-punctate, the punctures not separated; third abdominal tergite usually distinctly somewhat punctate or striate on basal half—16.
16. Anterior wing with the third cubital cell and the region behind it subhyaline or slightly fuliginous; usually part of the dorsum of abdomen and the entire venter testaceous—18. Anterior wing entirely clear hyaline; dorsum of abdomen and apical third of venter black—17.
17. Stigma not distinctly twice as long (measured along the anterior margin) as its greatest breadth, and with a conspicuous pale spot at base; posterior coxae wholly testaceous; ovipositor sheaths broadest near the middle, narrowing somewhat toward the apex from this point. 15. *harnedi*, new species.



- Stigma decidedly more than twice as long as its greatest breadth, and without a noticeable pale spot at base; ovipositor sheaths broadening steadily posteriorly, broadest at apex.---- 16. *pantographae*, new species.
18. Posterior coxae wholly black, and with a distinct flattened punctate area on outer upper edge at base; scutellum unusually small, flat; apex of posterior tibiae and the posterior tarsi blackish; ovipositor sheaths slender and hardly half as long as the abdomen.----- 17. *brittoni* Viereck. Posterior coxae usually pale on apical half and without such a distinct flattened area at base; posterior femora, tibiae and tarsi wholly testaceous; scutellum large, flat; ovipositor sheaths broad and two-thirds as long as the abdomen.----- 18. *gelechia* Riley.
19. Ovipositor sheaths hardly one-fourth as long as the abdomen and very slender; mesoscutum entirely, and the scutellum with distinct scattered shallow punctures.----- 19. *swammerdamiae*, new species. Ovipositor sheaths at least half as long as the abdomen; mesoscutum posteriorly, and scutellum impunctate and polished.----- 20.
20. Third abdominal tergite smooth; first tergite usually shorter than broad at apex; also usually shorter than the dorsum of the abdomen beyond second tergite; coxae always wholly black.----- 21. Third abdominal tergite somewhat roughened, first tergite usually longer than broad at apex, and usually longer than dorsum of abdomen beyond second tergite; occasionally all coxae are pale at apex.----- 23.
21. Venter of abdomen mostly yellowish; stigma pale brown without a paler spot at base; ovipositor sheaths distinctly two-third as long as the abdomen.----- 20. *carinata* Packard. Venter of abdomen black; stigma dark brown with a paler spot at base; ovipositor sheaths not more than half as long as the abdomen.----- 22.
22. Face shallowly weakly punctate and strongly shining; clypeus almost impunctate; posterior tibiae and tarsi pale testaceous; posterior margin of second tergite straight.----- 21. *comptanae* Viereck. Face and clypeus finely ruguloso-punctate and opaque; posterior tibiae at apex and the posterior tarsi blackish; posterior margin of second tergite curving forward at the sides.----- 22. *canadensis*, new species.
23. All femora mostly black or blackish.----- 23. *femoralis*, new species. All femora testaceous.----- 24.
24. Face very weakly punctate and shining, and without a distinct median carina extending from antennal fossae nearly half way to the clypeus, at most with a small polished tubercle below antennal fossae; clypeus almost impunctate.----- 24. *phthorimaeae*, new species. Face and clypeus very finely rugulose, with a prominent median polished carina extending from antennal fossae nearly halfway to the clypeus. 25.
25. Extreme apex of all coxae, and the trochanters pale; venter of abdomen yellowish on basal half; stigma unicolorous; fore wing without a fuscous spot across radius just below stigma.----- 25. *epagoges* Gahan. Coxae entirely, and the basal segment of trochanters, black; venter of abdomen black; stigma with a distinct pale spot at base; fore wing with a conspicuous fuscous spot across radius just below stigma. 26. *congregatiformis* Viereck.

1. *MICROGASTER ZONARIA* Say.

*Microgaster zonaria* SAY, Boston Journ. Nat. Hist., vol. 1, 1836, p. 263.

*Hypomicrogaster zonaria* Say, ASHMEAD, in Smith's Insects, N. J., 1900, p. 594.

*Protapanteles recurvariae* ASHMEAD, Journ. N. Y. Ent. Soc., vol. 11, 1903, p. 144.

*Microgaster recurvariae* Ashmead, MUESEBECK, Proc. U. S. Nat. Mus., vol. 58, 1920, p. 570.

*Type*.—Say's type has been lost, but the United States National Museum contains authentic material determined by Ashmead. The types of *recurvariae* are also in the National Collection.

Indiana; District of Columbia; Illinois; Ohio; New Jersey; Colorado.

*Hosts*.—*Recurvaria piceaella* Kearfott and *R. thujaella* Kearfott (Ashmead).

There can be no doubt that *recurvariae* Ashmead is *zonaria* Say. The species is readily distinguished by the characters given in the key.

The National Collection contains, in addition to the types of *recurvariae*, eight specimens from the Ashmead Collection, taken at Washington, District of Columbia; four from Algonquin, Illinois; one from Ohio and one labeled "Colo. 2037, Collection C. F. Baker." I have also seen the following additional material: one specimen from Chicago, Illinois, in Doctor Brues's collection at Harvard University; two, from Flatbush, New York, belonging to the American Museum of Natural History; and three specimens taken at Ithaca, New York, and three at Fairhaven, New York, which are in the collection of Cornell University.

## 2. MICROGASTER ECDYTOLOPHAE, new species.

Very similar to *zonaria*, differing from that species in its somewhat larger size, in the posterior coxae being black on the basal half, in the black second tergite, and in the longer ovipositor. It has the habitus of *Apanteles* and is easily misplaced in that genus because of the indistinctness of the second cubital cell.

*Female*.—Length 3 mm. Face a little broader than long, with distinct separate punctures; vertex mostly smooth and shining; temples weakly punctate and rather opaque; antennae about as long as the body; mesoscutum evenly rounded and rather evenly covered with distinct shallow punctures, shining; scutellum flat, impunctate, highly polished, with a poorly defined smooth impression posteriorly; propodeum punctate or very weakly rugulose, without a median carina, and with a suggestion of a median areola outlined by faint carinae; metapleurae almost entirely smooth and highly polished; stigma rather large, somewhat shorter than metacarpus; radius arising considerably beyond the middle of stigma, perpendicular to the anterior margin of wing and about as long as the first intercubitus; second cubital cell exceedingly minute, the second intercubitus very short and indistinct, and connecting cubitus and first intercubitus rather than

cubitus and the first abscissa of radius; posterior coxae large, at least half as long as thorax, closely punctate on the outer face, and with a very long, narrow, flattened, very finely aciculate area on the outer upper edge; inner spur of middle tibiae a little longer than middle metatarsus; inner spur of posterior tibiae at least two-thirds as long as posterior metatarsus; abdomen nearly as long as thorax but much more slender; first dorsal abdominal plate large, covering more than a third of the abdomen, broader at apex than at base, a little longer than its greatest breadth, and rather evenly covered with distinct separate punctures, strongly shining; second tergite short and broad, much shorter than the third, and nearly four times as broad as long down the middle, where it is longer than at the sides, the posterior margin being decidedly curved; practically the entire second plate, like the remainder of the abdomen, smooth and polished; hypopygium prominent but not surpassing the apex of the last dorsal segment; ovipositor sheaths nearly as long as the abdomen. Black; labrum, mandibles, and palpi yellowish; scape, except a narrow black stripe on the outer side, and the apex, bright yellow; remainder of the antennae black; tegulae and wing-bases pale yellow; wings very clear hyaline; costa yellowish; other veins largely, and the stigma, brown; anterior and middle legs entirely pale yellow, the tarsi whitish, the pulvilli brown; posterior coxae black on the basal half or two-thirds, yellow beyond; posterior trochanters pale; posterior femora testaceous except at extreme tip, their tibiae blackish on the apical third, their tarsi brown except at extreme base; abdomen black; the third tergite bright testaceous except medially and along posterior margin; venter of abdomen entirely testaceous; ovipositor sheaths black.

*Male*.—Like the female, except that the abdomen is more slender, the first tergite being nearly parallel-sided, and the second not so broad as in the female; the third tergite is almost entirely black.

*Cocoons*.—White, solitary, with a little loose silk.

*Type locality*.—Falls Church, Virginia.

*Allotype locality*.—Bentonville, Arkansas.

*Type*.—Cat. No. 23987, U.S.N.M.

*Hosts*.—*Ecdytolopha insiticiiana* Zeller on *Robinia*; *Canarsia hammondi* Riley; *Gelechia*, species (?).

Described from five females and two males bearing the following data: Type, reared from *Ecdytolopha insiticiiana* at Falls Church, Virginia, July 25, 1914, by C. Heinrich, under Hopkins U. S. No. 12103 L-2; *allotype*—Bentonville, Arkansas, Aug. 1, 1919; *paratypes*—two reared from *Canarsia hammondi* Riley July 23, 1919, by D. Isely, in the Bureau of Entomology, under Quaintance No. 16471; one labeled "Parasite on *Gelechia* sp.?" and one labeled "Cana. 2156 Collection

C. F. Baker." There are two additional specimens in the National Collection bearing the label, "Victoria, Tex., Hunter No. 2391, J. D. Mitchell, Collector." I have also seen seven specimens in the Cornell University Collection: three from Freeville, New York; one from Ithaca, New York; one from Truro, Nova Scotia, collected by Dr. R. Matheson; and two from Mount Whiteface, New York, 2,000-4,000 feet, collected August 22-24, 1916.

### 3. MICROGASTER GARMANI (Ashmead).

*Protomicroplitis germani* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 132 (without specific description).

A very distinct species, easily placed by the characters given in the foregoing key.

*Female*.—Length 4 mm. Face and clypeus confluent punctate, shining, a prominent polished median carina extending half way from antennal fossae to the clypeus; vertex very shallowly minutely punctate and shining; the temples, and more particularly the cheeks, coarsely punctate; antennae a little longer than the body; mesoscutum and scutellum covered with closely placed but distinct, deep punctures, shining; mesopleurae coarsely punctate except for a smooth and highly polished subquadrate area on the upper middle region; below and just behind the middle there is a shallow, noncrenulate depression; propodeum coarsely rugose, with a prominent median longitudinal carina; stigma moderate, about as long as the metacarpus; radius arising a little beyond middle of stigma, curved and directed outward, nearly twice as long as the first intercubitus; posterior coxae large, more than half as long as the thorax, entirely coarsely punctate; inner spur of middle tibiae as long as middle metatarsus; inner spur of hind tibiae two-thirds as long as hind metatarsus; abdomen slender, compressed, nearly as long as thorax; first dorsal abdominal plate long and slender, more than three times as long as broad, the sides nearly parallel, base and apex of equal breadth; a deep median longitudinal channel extending nearly to the apex of the first plate, the basal half of the plate polished, the apical half weakly roughened and shining; second dorsal abdominal plate smooth and polished, medially a little shorter than the third tergite, strongly angularly emarginate anteriorly, the sides extending forward acutely more than one-third the length of the basal plate; remainder of the abdomen smooth and shining; ovipositor sheaths slender, less than half as long as the abdomen. Black; labrum and mandibles except at base and apex, reddish-testaceous; palpi pale yellow; antennae brownish-black; tegulae testaceous; wing-bases brown; wings hyaline, subhyaline at apex; veins and stigma brown; all coxae black; remainder of fore and middle legs testaceous, except the trochanters and the femora basally, which are brownish; posterior trochanters

and femora black; apical half of posterior tibiae and the posterior tarsi strongly infuscated; abdomen blackish above, the broad membranous margins along the plate of the first segment pale yellow; venter of abdomen piceous, yellow at base.

*Male*.—Essentially as in the female.

*Type locality*.—Champaign, Illinois.

*Type*.—Cat. No. 23986, U.S.N.M.

Described from four specimens collected at Champaign, Illinois, and bearing Ashmead's type labels. The National Collection contains the following additional material: two specimens from Lexington, Kentucky; three specimens collected by G. R. Pilate at Opelousas, Louisiana; ten from the C. F. Baker Collection, all taken in Louisiana; one collected by R. A. Cushman at Vienna, Virginia, June 4, 1911; and one taken in the District of Columbia June 2, 1884. I have also seen one specimen, taken by W. M. Mann, at Wathena, Kansas, in the collection of Dr. C. T. Brues at Harvard University; and one collected at Flatbush, New York, by J. L. Zabriskie, which is in the collection of the American Museum of Natural History.

As originally proposed by Ashmead this species was named *germani*, but as this is manifestly a typographical error, as the species was intended to be named for Professor Garman, I have considered it desirable and permissible to use the above spelling.

#### 4. MICROGASTER MEDIATA Cresson.

*Microgaster medius* CRESSON, Proc. Ent. Soc. Philad., vol. 4, 1865, p. 66.

*Protomicroplitis medius* CRESSON, ASHMEAD, Trans. Lond. Ent. Soc., 1900, p. 292.

*Type*.—In the Academy of Sciences at Philadelphia.

This species is readily distinguished from *calliptera*, to which it is most closely allied, by the reddish-testaceous head and thorax, only the metapleurae and propodeum being black; also by the hyaline nonmaculated wings.

Cuba, Mexico.

In addition to the type the Philadelphia collection contains five other specimens from Cuba and one from Mexico. No other material of this species is known to me.

#### 5. MICROGASTER CALLIPTERA Say.

*Microgaster calliptera* SAY, Boston Journ. Nat. Hist., vol. 1, 1836, p. 264.

*Microgaster maculipennis* CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 183.

*Type*.—The type of *calliptera* has been lost, but the species is sufficiently well characterized to make its identity certain. The type of *maculipennis* is in the Philadelphia Academy of Sciences.

Texas; Georgia; Kansas; Louisiana; Colorado; North Carolina.

*Hosts*.—*Perigea sutor* Guenée; *Platysenta videns* Guenée.

*Cocoons*.— Large, white, with a little loose silk.

I have seen the following material of this species: type of *maculipennis*, from Texas, paratype and six other specimens from Georgia, in the Philadelphia Academy of Sciences; three specimens of the type series of *maculipennis*, from Texas, in the United States National Museum. The National Collection contains in addition, one specimen from Lawrence, Kansas, collected June 20, 1895, by Hugo Kahl; one from Cypress Mills, Texas; one from Louisiana and one from Colorado, from the C. F. Baker Collection; one reared at Raleigh, North Carolina, August 23, 1919, by C. S. Brimley, from *Perigea sutor* Guenée; five specimens, without locality label, reared from *Platysenta videns* Guenée; two specimens labeled Victoria, Texas, October 21, 1914, J. D. Mitchell, collector, and bearing Hunter No. 3478; one from the same locality by the same collector, dated April 14, 1915, bearing Hunter No. 3579; and one specimen taken at Victoria, Texas, August 3, 1910, on *Cassia*, species, by J. D. Mitchell.

#### 6. MICROGASTER IRIDESCENS Cresson.

*Microgaster iridescens* CRESSON, Proc. Ent. Soc. Philad., vol. 4, 1865, p. 63.

*Urogaster iridescens* CRESSON, ASHMEAD, Trans. Lond. Ent. Soc., 1900, pp. 277, 278.

*Type*.—In the Philadelphia Academy of Natural Sciences.

This species has the habitus of an *Apanteles*, which fact, together with the indistinct, minute second cubital cell, caused Ashmead to erroneously refer it to *Urogaster*, one of the genera into which he divided *Apanteles*. It is readily separated from *xanthaspis* by the pale yellow posterior coxae and the less strongly sculptured mesonotum.

Cuba; Florida.

Known from the type and two paratype specimens from Cuba, in the Philadelphia Academy of Sciences; and eight specimens in the United States National Museum which were collected by Dr. H. G. Dyar, at Palm Beach, Florida.

#### 7. MICROGASTER XANTHASPIS (Ashmead).

*Apanteles xanthaspis* ASHMEAD, Trans. London Ent. Soc., 1900, p. 280.

*Microgaster xanthaspis* Ashmead, MUESEBECK, Proc. U. S. Nat. Mus., vol. 58, 1920, p. 570.

*Cotypes*.—Two cotypes, one of each sex, are in the United States National Museum; others are in the British Museum.

At once distinguished from *iridescens* by the black posterior coxae and femora, and the confluent punctate mesoscutum.

St. Vincent; Grenada.

Known to me only from the two cotypes in the National Collection.



8. *MICROGASTER BAKERI*, new species.

Very similar to *xanthaspis*, from which it differs in the normal second cubital cell, and the other characters given in the table to species.

*Female*.—Length 2.3 mm. Face a little longer than broad, uniformly closely punctate and opaque, with a rather distinct median longitudinal carina; vertex and temples more weakly punctate and shining; antennae as long as the body; mesoscutum and scutellum uniformly closely sharply punctate and opaque, the latter distinctly convex; mesopleurae smooth and highly polished, except anteriorly, where they are closely punctate and opaque; propodeum short, rather flat, punctate or very minutely rugulose, with a prominent median carina, opaque; metapleurae almost entirely smooth and highly polished; metacarpus somewhat longer than stigma; radius arising from stigma somewhat beyond middle, perpendicular to the anterior margin of wing, and longer than the first intercubitus; second intercubitus hyaline, but distinct, and joining cubitus with the end of the first abscissa of the radius; posterior coxae more than half as long as the thorax, finely granular and opaque above; inner spur of middle tibiae a little longer than middle metatarsus; inner spur of posterior tibiae about three-fourths as long as posterior metatarsus; abdomen very slender, about as long as the thorax; the first dorsal abdominal plate very narrow, three times as long as its greatest breadth, and narrower at apex than at base, channeled down the middle, and very weakly roughened posteriorly; second abdominal tergite much shorter than the third, transverse, strongly emarginate behind, and provided with two longitudinal furrows medially, which converge slightly behind, the entire tergite smooth and shining like the remainder of the abdomen. Black; labrum, mandibles, palpi, pale; antennal scape testaceous; flagellum brownish-black; tegulae and wing-bases pale yellow; wings hyaline, stigma brown, veins pale brown; fore and middle legs entirely yellow; posterior coxae black, their trochanters yellow, their femora reddish-testaceous on the basal half, brown to black on the apical half; posterior tibiae pale yellow with a broad black band at apex; tarsi dusky except at extreme base of basal segment; abdomen black, except the first dorsal plate and the membranous margins along the two basal plates, which are reddish; venter of abdomen reddish on the basal two-thirds.

*Male*.—Like the female in all essential characters.

*Type locality*.—Louisiana.

*Type*.—Cat. No. 23988, U.S.N.M.

Described from one female and two male specimens from the C. F. Baker Collection, the female and one of the males from Louisiana, the other male from Kansas.

## 9. MICROGASTER SCHIZURAE, new species.

Closely resembles *facetosus*, but differs from that species in having the mesonotum, propodeum, and two basal abdominal tergites only weakly punctate and shining.

*Female*.—Length, 3.5 mm. Face confluent punctate; vertex and temples with but few shallow scattered punctures, and strongly shining; antennae about as long as the body; mesoscutum and scutellum with distinct well-separated punctures, shining; mesopleurae highly polished, with only a few weak punctures anteriorly and below; propodeum very weakly punctate, with a prominent median carina and a few irregular rugae at the sides; metapleurae smooth, highly polished; stigma as long as the metacarpus; radius nearly perpendicular to the anterior margin of the wing and much longer than the first intercubitus; posterior coxae large, more than half as long as the thorax, mostly smooth and shining, with a large elongate flattened punctate area on the outer upper edge; inner spur of middle tibiae a little longer than the middle metatarsus; inner spur of posterior tibiae at least two-thirds as long as the posterior metatarsus; abdomen as long as thorax; the first tergite broadening somewhat posteriorly, with the posterior angles evenly rounded off; second tergite transverse, about as long as the third, and provided with two nearly parallel longitudinal grooves medially; the first tergite smooth and polished except at apex, where there are a few weak punctures; the second tergite mostly smooth and polished with very few weak scattered punctures; third and following tergites wholly smooth and highly polished; hypopygium not prominent; ovipositor sheaths very short, hardly surpassing the apex of the abdomen. Black; labrum, mandibles, and palpi pale yellow; antennae testaceous below, brown above; wings hyaline; tegulae and wing-bases pale yellow; veins and stigma light brown, the latter without a pale spot at base; fore and middle legs wholly pale yellow; posterior coxae varying from black to dark red at apex; remainder of posterior legs deep testaceous, except the lower edge of the femora, which is somewhat infuscated; abdomen brownish above on the three basal tergites, black beyond; the lateral membranous margins along the two basal plates, and practically the entire venter, pale testaceous.

*Male*.—Essentially as in the female.

*Cocoons*.—Cylindrical, white, with considerable loose silk; apparently gregarious.

*Type locality*.—Riley County, Kansas.

*Type*.—Cat. No. 23990, U.S.N.M.

*Hosts*.—*Schizura unicornis* Smith and Abbot; *S. concinna* Smith and Abbot.

Described from the following material in the United States National Museum; two female specimens labeled "May 19, Riley Co.,

Kansas, Popenoe, parasitic on *Schizura unicornis* 1461"; three males reared Jan. 3, 1884, in the Bureau of Entomology, under No. 359 L-o, the host recorded as *Tinea biseliella*, which record is doubtless incorrect; one specimen taken at Lawrence, Kansas, June 19, 1896, by Hugo Kahl; and six specimens, together with cocoons, reared from *Schizura concinna*, at Westerville, Ohio, July 14, 1897. I have also seen three specimens, collected by J. A. Grossbeck, at New Brunswick, New Jersey, which are from the collection of the American Museum of Natural History.

#### 10. MICROGASTER AURIPES Provancher.

*Microgaster auripes* PROVANCHER, Addit. Faun. Canad. Hymen., 1886, p. 141.

*Type*.—In the Museum of Public Instruction at Quebec.

Legs including all coxae bright reddish-testaceous; abdomen, except most of the first tergite and the middle of the second, which are blackish, reddish-testaceous; occasionally the apical abdominal segments are dusky medially. The two basal abdominal tergites, and part of the third rugulose.

Canada; Kansas; Virginia; Ohio; Kentucky; New York.

*Host*.—*Neleucania albilinea* Huebner.

The following material of this species is in the United States National Museum. Nine specimens from Riley County, Kansas; one from Onaga, Kansas; one, without locality, reared from *Neleucania albilinea*; one from Virginia, taken in August, 1879; one collected at Wooster, Ohio, July 10, 1897; one from Arlington, Virginia, one from Lexington, Kentucky, and several without locality data. I have also seen four specimens in the Cornell University Collection, one collected June 8-10, 1915, at Chipmunk Swamp, Vandalia, New York; two taken at Ithaca, New York, July 19, 1904, and July 4, 1908, respectively, by C. S. Spooner; and one labeled "Caroline-Hartford, New York, June 15."

#### 11. MICROGASTER BREVICAUDA Provancher.

*Microgaster brevicaudus* PROVANCHER, Addit. Faun. Canad. Hymen., 1886, p. 140.

*Diolcogaster brevicauda* Provancher, ASHMEAD, In Smith's Ins. N. J., 1900, p. 594.

*Type*.—In the Museum of Public Instruction at Quebec. Point Rouge, Canada.

This species has been assigned its place in the key on the basis of the original description, and notes made by Mr. A. B. Gahan. I have seen no authentic material. There are two specimens in the collection of the Philadelphia Academy of Sciences which are labeled *brevicaudus*, but I question the correctness of this determination.

12. *MICROGASTER FACETOSA* Weed.

*Microgaster facetosa* WEED, Trans. Amer. Ent. Soc., vol. 15, 1888, p. 296.

*Microgaster (Diolcogaster) solidaginis* VIERECK, Bull. Conn. State Geol. and Nat. Hist. Survey., 1917 (1916), p. 202.

*Type*.—Two specimens, at least one of them, labeled "Type 2," belonging to Weed's type series of two specimens, are in the United States National Museum. The type of *solidaginis* is in the collection of the Connecticut Agricultural Experiment Station at New Haven.

This species is extremely variable both as to color and sculpture. The mesonotum, propodeum and first three abdominal tergites are strongly roughened in the female, but usually much less so in the male; the female normally has considerable testaceous coloring on the third and fourth tergites; while in the male rarely more than a narrow transverse band along the posterior margin of third tergite is testaceous, and frequently the dorsum is wholly black.

Illinois; Connecticut; Tennessee; Ohio; Maryland; Pennsylvania; Michigan; Colorado; Kansas; New York; Massachusetts; Vermont; New Hampshire; Maine; Washington; British Columbia; and Ontario, Canada.

*Host*.—*Plathypena scabra* Fabricius.

In addition to the type material mentioned above I have seen many specimens from diverse localities. In the National Collection there are, besides the two specimens which are apparently Weed's types, eight specimens reared by C. C. Hill, in the Bureau of Entomology, under Webster No. 8337, from *Plathypena scabra*, at Nashville, Tennessee; eight others reared from the same host, by the same worker, at Knoxville, Tennessee; one specimen from Wooster, Ohio; one from Fort Washington, Maryland; one from Agricultural College, Michigan; several specimens from the C. F. Baker Collection, taken in Pennsylvania, Michigan, Colorado, Kansas, and Canada; and two specimens reared by H. L. Parker, July, 1915, from *Plathypena scabra*, at Hagerstown, Maryland. In the collection of the Boston Society of Natural History there is one specimen collected by Mr. C. W. Johnson at Jaffrey, New Hampshire. Doctor Brues's collection at Harvard University contains specimens from Blue Hills and Woods Hole, Massachusetts; Mount Constitution and Index, Washington; Dummerston, Vermont; Calais, Maine; and Lake McDonald, Glacier Park, Montana; and in the Cornell University Collection there are specimens from the following localities: Slaterville, Caroline, Hartford, Freeville, Rock City, West Danby, and Waterville, in New York State; Woods Hole, Massachusetts; Wau-bamic, Ontario; and Carbonate, British Columbia.

13. *MICROGASTER RUBRICOXA* Provancher.

*Microgaster rubricoxus* PROVANCHER, Addit. Faun. Canad. Hymen., 1888, p. 386.

*Hygroplitis rubricoxus* Provancher, ASHMEAD, in Smith's INS. N. J., 1900, p. 594.

*Type*.—In the Museum of Public Instruction at Quebec.

This species is very distinct from all other species of *Microgaster*, in that the propodeum is almost horizontal; also in possessing a fine but distinct crenulate furrow on the mesopleurae; in the somewhat shorter tibial spurs; and the very large apical tarsal segment. The abdomen is long, with nearly parallel sides; the first two abdominal tergites large and coarsely rugose; the third and fourth tergites are usually partly testaceous, also the venter of the abdomen, and the posterior coxae.

Canada; New York; Massachusetts; Maine.

*Host*.—Unknown.

The National Collection contains a homotype (determined by Gahan), from Ottawa, Canada; one other specimen from the same locality; one from Long Island, New York; one from Ithaca, New York; and one labeled "Cana. 2068, Collection C. F. Baker." I have seen in Doctor Brues's collection five specimens from Woods Hole, one from Fall River, and one from Essex County, Massachusetts. The collection of the Boston Society of Natural History has five specimens collected by Mr. C. W. Johnson on Mount Desert, Maine, and two taken by the same collector at Williamsburg, Massachusetts. The Cornell Collection contains a single specimen from Spring Lake, Cayuga County, New York.

14. *MICROGASTER MELLIGASTER* Provancher.

*Microgaster melligaster* PROVANCHER, Addit. Faun. Canad. Hymen., 1886, p. 143.

*Diolcogaster melligaster* Provancher, ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 132.

*Type*.—In the Museum of Public Instruction at Quebec, Canada.

I have seen no specimens of this species. It has been assigned its place in the key on the basis of the original description, and notes by Mr. Gahan, made upon an examination of the type.

15. *MICROGASTER HARNEDI*, new species.

Very similar to *pantographae*, from which it can be separated however, by the characters noted in the table to species.

*Female*.—Length 4 mm. Face ruguloso-punctate, with a short polished median ridge below antennal fossae; clypeus well separated from face; vertex and temples weakly punctate and shining; antennae nearly as long as the body; mesoscutum punctate and shin-

ing anteriorly and below; propodeum coarsely rugose, with a prominent median longitudinal carina; stigma a little shorter than metacarpus and hardly twice as long as broad; radius arising far out on stigma, the inner side of the latter about twice as long as the outer; radius tending strongly outward, much longer than the first intercubitus; posterior coxae large; inner spur of middle tibiae at least as long as middle metatarsus; inner spur of posterior tibiae much more than half as long as the posterior metatarsus; abdomen broad, stout, nearly as long as the thorax; the first tergite very large, broadening toward apex, where it is nearly as broad as long, very coarsely rugose; second tergite transverse, longer than third, and three times as broad as long, entirely coarsely rugose; third tergite somewhat punctate and indistinctly striate on basal half, polished beyond; the following tergites smooth and polished; hypopygium strongly developed: ovipositor sheaths more than two-thirds as long as the abdomen, broad, broadest a little beyond the middle, from which point they taper somewhat toward apex. Black; mouth parts and antennae usually blackish; tegulae and wing-bases transparent-yellow; wings entirely hyaline, the veins and stigma dark brown, the latter pale at base; legs, including all coxae, testaceous, except extreme apex of posterior femora, the apical third of posterior tibiae, and the posterior tarsi, which are fuscous; abdomen black; the venter testaceous on basal half; ovipositor sheaths black.

*Type locality*.—Agricultural College, Mississippi.

*Type*.—Cat. No. 23991, U.S.N.M.

*Host*.—*Pyrausta ainslei* Heinrich; *Diatraea*, species.

Described from two female specimens, the type reared from *Pyrausta ainslei*, by R. W. Harned, August 23, 1920, at Agricultural College, Mississippi; the paratype reared from a *Diatraea* larva in corn-stalk, at Bentonville, South Carolina, August 31, 1915, by E. R. Barber.

#### 16. MICROGASTER PANTOGRAPHAE, new species.

Very similar to *harnedi*, also to *gelechia*. It differs from the former in the much longer stigma, the basally black posterior coxae, and in the ovipositor sheaths being broadest at apex; from *gelechia* it is distinguished by the clear hyaline wings, and by the apex of the posterior tibiae and the posterior tarsi being strongly infuscated.

*Female*.—Length 4.2 mm. Face confluent punctate and shining, with a short polished median carina below antennal fossae; vertex almost impunctate; temples weakly punctate and shining; mesoscutum weakly punctate anteriorly, impunctate and polished behind; scutellum impunctate and highly polished; mesopleurae shallowly punctate and strongly shining anteriorly and below, polished pos-



teriorly and on the upper half, and without a crenulate furrow; propodeum coarsely rugose, with a prominent median carina; stigma large, almost as long as the metacarpus; radius arising a little beyond the middle of stigma, tending strongly outward, and much longer than first intercubitus; posterior coxae large, half as long as the thorax; inner spur of middle tibiae as long as the basal segment of their tarsi; inner spur of posterior tibiae much more than half as long as posterior metatarsus; abdomen as long as the thorax, broad, stout; the first tergite large, broadening posteriorly, a little broader at apex than long down the middle, entirely coarsely rugose; second tergite transverse, about three times as broad as long, and longer than the third tergite, its posterior margin nearly straight, and, like the first tergite, entirely coarsely rugose; the third abdominal tergite weakly roughened on the basal half, at least medially; remainder of the dorsum of the abdomen smooth and shining; hypopygium large, but not surpassing the apex of the last dorsal abdominal segment; ovipositor sheaths broad and about two-thirds as long as the abdomen, broadening gradually posteriorly, broadest at apex. Black; labrum and mandibles red; labium and palpi pale yellow; antennae dark brown; tegulae and wing-bases bright testaceous; wings entirely hyaline, not at all clouded apically; veins and stigma pale brown; anterior and middle legs, including coxae, wholly pale yellow; posterior coxae black at base, testaceous on apical half; remainder of the posterior legs testaceous, except the extreme apex of femora, apex of tibiae and the tarsi, which are fuscous; abdomen entirely black above, yellowish beneath on the basal half or two-thirds; ovipositor sheaths black.

*Type locality*.—Bangor, Maine.

*Type*.—Cat. No. 23992, U.S.N.M.

*Host*.—Pyralid leaf-roller on linden, probably *Pantographa lineata* Grote and Robinson; also *Gelechia cercerisella* Chambers.

Described from two female specimens reared from the linden leaf-roller taken in Mount Hope Cemetery, Bangor, Maine, 1883. The National Collection contains the following additional material: three specimens, without locality label, reared August 4, 1899, from the linden leaf-roller; another without locality, labeled "*Pantographa lineata*"; one specimen reared by C. Heinrich from *Gelechia cercerisella*, at Great Falls, Virginia, under Hopkins U. S. No. 11187-b; and one specimen labeled "Cana. 2068, Collection C. F. Baker." I have also seen three specimens of this species, taken at Ithaca, New York, in the Cornell University Collection; and one specimen in the Collection of the Boston Society of Natural History, which was taken by J. A. Cushman, at Tisbury, Massachusetts, July, 1913.

17. *MICROGASTER BRITTONI* Viereck.

*Microgaster (Microgaster) brittoni* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1917 (1916), p. 202.

*Type*.—In the Connecticut State Agricultural Experiment Station, at New Haven.

Wings slightly fuliginous apically; scutellum small, flat, smooth and polished; propodeum coarsely rugose and dull; first abdominal tergite about as broad at apex as long down the middle; the first and second tergites rugose; tegulae usually blackish; all coxae black; apex of posterior femora and tibiae, and the posterior tarsi, fuscous; third and fourth abdominal tergites more or less, and practically the entire venter of abdomen, testaceous.

Connecticut; New York; Massachusetts; Canada.

The male type specimen, from Kent, Connecticut, is the only specimen in the collection of the Connecticut Experiment Station. The National Collection contains six specimens, three without locality label; one from Ithaca, New York; and two taken in Canada, from the C. F. Baker Collection. I have seen one specimen in the collection of the Boston Society of Natural History, which was collected by Mr. C. W. Johnson, at Brookline, Massachusetts; and six specimens in the Cornell University Collection from the following localities: Spencer Lake, Otto, Ithaca, Rochester Junction, and Taughannock, New York; and Woods Hole, Massachusetts.

18. *MICROGASTER GELECHIAE* Riley.

*Microgaster gelechiae* RILEY, First Ann. Rpt. Insects Mo., 1869, p. 173.

*Type*.—In the United States National Museum.

Readily distinguished by the characters given in the table to species. Missouri; Wisconsin; Maryland; Virginia; Massachusetts; Louisiana; New York.

*Host*.—*Gnorimoschema gallaesolidaginis* Riley.

In addition to the types the United States National Museum Collection contains the following material—two specimens, from Vienna, Virginia, reared by R. A. Cushman, from the above-named host in the Bureau of Entomology, under Quaintance No. 7803; two specimens with the same host, locality and collector data, reared under Quaintance No. 7803; twenty specimens reared by Mr. Cushman, at Great Falls, Virginia, from *G. gallaesolidaginis*; three reared from the same host at Tullalah, Louisiana, under Hunter No. 1931; and collected specimens from Wisconsin; Cedar Point, Maryland; and Provincetown, Massachusetts. There is one specimen in the Cornell Collection, from Otto, New York.

## 19. MICROGASTER SWAMMERDAMIAE, new species.

The distinct punctation of the entire mesoscutum and scutellum and the short ovipositor will readily distinguish this species from its closest allies, *carinata*, *canadensis*, and *congregatiformis*.

*Female*.—Length, 2.8 mm. Face a little broader than long, with closely placed distinct punctures, and with an indistinct shining median tubercle below the antennal fossae; antennae distinctly longer than the body, mesoscutum entirely distinctly punctate, shining; scutellum large, nearly flat, more feebly, but distinctly, punctate; mesopleurae mostly smooth and polished, only weakly punctate anteriorly and below; propodeum rugulose, with a prominent median longitudinal carina; stigma broad, shorter than the metacarpus; radius arising slightly beyond middle of stigma, somewhat directed backward, only a little longer than the first intercubitus; posterior coxae at least half as long as thorax, mostly polished, with a flattened punctate area on the outer upper edge; inner spur of middle tibiae a little longer than middle metatarsus; inner spur of posterior tibiae two-thirds as long as posterior metatarsus; abdomen narrower than, and about as long as, thorax, at least two and one-half times as long as broad; first tergite broadening posteriorly, indistinctly longer than broad at apex, finely rugulose; second tergite transverse, slightly more than twice as broad as long, and distinctly longer than the third, very finely rugulose, the suture between it and the third very minutely crenulate and straight; third tergite practically entirely smooth and shining, with only a faint suggestion of roughening at the extreme base medially, remainder of dorsum of abdomen smooth and shining; ovipositor sheaths slender, projecting only one-fourth the length of the abdomen. Black; labrum and apex of mandibles reddish; labium and palpi pale yellow; antennae wholly brownish black; tegulae black; wings hyaline, with the apical half weakly fuliginous; all coxae black; remainder of the legs bright yellow, except the extreme apex of posterior femora and tibiae and the posterior tarsi, which are infuscated. Abdomen black above; the narrow membranous margins along the first and second tergites and most of the venter, pale yellow; sometimes the third tergite is pale at extreme sides.

*Male*.—Like the female in all essential characters.

*Cocoons*.—4.5 mm. long, cylindrical, white, thin, with an indistinct semitransparent band near the middle.

*Type locality*.—East River, Connecticut.

*Type*.—Cat. No. 23993, U.S.N.M.

*Host*.—*Swammerdamia castaneae* Busck.

Described from four female and eight male specimens reared by C. R. Ely at East River, Connecticut, August 4, 1917. There is in

the National Collection also one male specimen reared from *Swammerdamia* on black birch by C. R. Ely at East River, Connecticut, August 19, 1917.

20. *MICROGASTER CARINATA* Packard.

*Microgaster carinata* PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, 1880, p. 25.

*Microgaster glecthiae*, var. *carinata* RILEY, Amer. Natural, vol. 16, 1882, p. 679.

*Type*.—In the United States National Museum.

Readily distinguished by the characters given in the key to species. Massachusetts (?)

*Host*.—*Vanessa atalanta* Linnaeus (Packard).

Known only from the type material.

21. *MICROGASTER COMPTANAE* Viereck.

*Microgaster comptanae* VIERECK, Proc. U. S. Nat. Mus., vol. 39, 1911, p. 403.

*Type*.—In the United States National Museum.

Face very weakly punctate and strongly shining, with no indication of a median carina below antennal fossae; posterior femora, tibiae and tarsi, wholly testaceous; third abdominal tergite entirely smooth.

Rocky Ford, Colorado.

*Host*.—*Ancylis comptana* Frölich.

Known only from the two specimens of the type series.

22. *MICROGASTER CANADENSIS*, new species.

Very similar to *comptanae* Viereck, from which it can be distinguished by the rugulose face, by the posterior tibiae at apex and the posterior tarsi being infuscated, and by its larger size.

*Female*.—Length 3.3 mm. Face finely rugulose and opaque; vertex polished; temples weakly punctate and shining; antennae very slightly shorter than the body; mesoscutum punctate anteriorly, impunctate and polished posteriorly; scutellum flat, impunctate, polished; mesopleurae practically entirely impunctate and polished, with a smooth, dimple-like impression posteriorly; propodeum rugose, with a prominent median carina; stigma about as long as metacarpus; radius arising a little beyond middle of stigma and somewhat directed outward; posterior coxae smooth and polished, about half as long as thorax; inner spur of middle tibiae as long as middle metatarsus; inner spur of posterior tibiae two-thirds as long as posterior metatarsus; abdomen broad, as long as thorax, and about twice as long as its greatest breadth; first abdominal tergite broadening posteriorly, about as broad at apex as long, rugose; second tergite transverse, more than three times as broad as long, no longer than third; suture between second and third tergites minutely crenulate and distinctly curving forward at the sides, so that the second

tergite is longest medially; third tergite, like the following, smooth and polished; ovipositor sheaths a little more than half as long as the abdomen, broadening gradually toward apex. Black; mouth-parts piceous; antennae black; tegulae and wing-bases black; wings hyaline, the apical third very weakly fuliginous; all coxae and basal segment of trochanters black; remainder of legs testaceous, except a small spot on the lower side of posterior femora at base, the apices of posterior femora and tibiae, and the posterior tarsi, which are blackish; abdomen wholly black.

*Male*.—Differs from female only in the longer antennae, in the second abdominal tergite being longer than the third, and in the suture between second and third tergites not curving forward so distinctly at the sides.

*Type locality*.—Canada.

*Type*.—Cat. No. 23995, U.S.N.M.

Described from six female and seven male specimens labeled "Cana. 2156, Collection C. F. Baker."

Besides the type series, which is in the National Collection, I have seen the following material of this species: one specimen, in the Boston Society of Natural History, collected by Mr. C. W. Johnson, at Auburndale, Massachusetts; one specimen in Doctor Brues's collection, from Hyannis Point, Massachusetts; and one from the collection of the American Museum of Natural History, taken at Nyack, New York, by J. L. Zabriskie.

#### 23. MICROGASTER FEMORALIS, new species.

Very close to *phthorimaeae*. It differs from that species in the black femora, in the more punctate and less polished mesoscutum, the smaller scutellum, the more finely striate third tergite, the narrower and unicolorous stigma, and the somewhat shorter ovipositor.

*Female*.—Length 2.8 mm. Face prominent, broader than long, finely punctate, and with a more or less distinct shining tubercle below the antennal fossae; vertex impunctate, polished; temples very shallowly punctate and shining; antennae a little shorter than the body; mesoscutum entirely distinctly though shallowly punctate, shining; scutellum small, very slightly convex, impunctate and polished; mesopleurae weakly punctate anteriorly and below, but mostly polished; propodeum rugose, with a median longitudinal carina; stigma rather narrow, and about as long as the metacarpus; radius arising far out on stigma, rather strongly curved; second cubital cell small; posterior coxae about half as long as the thorax, mostly smooth and shining, without a distinct flattened area on the outer edge at base; inner spur of middle tibiae a little longer than middle metatarsus; inner spur of posterior tibiae two-thirds as long as the posterior

metatarsus; abdomen about twice as long as broad, and nearly as long as the thorax; first tergite broadening posteriorly, as broad at apex as long, entirely rugose; second tergite transverse, nearly three times as broad as long, longer than the third, entirely rugose, and separated from the third by a sharp crenulate suture that distinctly curves forward laterally; third tergite distinctly delicately aciculated on the basal two-thirds; remainder of the abdomen smooth and shining; ovipositor sheaths narrow, about half as long as the abdomen. Black; mouthparts, including labial palpi and the two basal segments of the maxillary palpi, black; antennae, tegulae and wing-bases black; wings very weakly fuliginous, the median cell hyaline; veins and stigma brown, the latter without a pale spot at base; all coxae and trochanters black; fore and middle femora black on the basal half; posterior femora dark reddish-brown, tinged with blackish, remainder of the legs mostly yellowish-brown; abdomen wholly black.

*Male*.—Like the female, except that the antennae are longer than the body, the abdomen is more slender, the posterior femora are entirely black, and the mesoscutum is not so distinctly punctate posteriorly.

*Type locality*.—Tuolumne Meadows, Soda Springs, California.

*Type*.—Cat. No. 23996, U.S.N.M.

Described from one female and one male taken by G. R. Pilate at the above locality, August 8, 1916.

#### 24. MICROGASTER PHTHORIMAEAE, new species.

Closely resembles *congregatiformis*, from which it differs in wanting the prominent median facial carina, in the black tegulae, in the shorter and narrower ovipositor sheaths, and in wanting the conspicuous dusky spot on the fore wing just below stigma.

*Female*.—Length 3.3 mm. Face closely punctate, with a more or less distinct shining median tubercle below antennal fossae, but without a strong median carina; vertex practically impunctate, polished; temples very weakly punctate and shining; antennae about as long as the body; mesoscutum closely shallowly punctate anteriorly, impunctate and polished behind; scutellum flat, impunctate, polished; mesopleurae highly polished, and without a crenulate furrow, but with a dimple-like impression posteriorly; propodeum coarsely rugose, with a prominent median longitudinal carina; metapleurae coarsely rugose; stigma subequal in length with the metacarpus; radius curved, directed outward; coxae half as long as the thorax, mostly polished, with an elongate flattened punctate area on the outer upper edge at base; inner spur of middle tibiae as long as the middle metatarsus; inner spur of posterior tibiae much more than half as long as the posterior metatarsus; abdomen broad, not quite as long



as thorax, and hardly twice as long as its greatest breadth; first abdominal tergite as broad at apex as long, and coarsely rugose, second tergite transverse, two and one-half times as broad as long, entirely rugose; the crenulate suture between the second and third tergites distinctly curving forward at the sides; the first and second tergites together covering about two-thirds of the dorsum of the abdomen; third abdominal tergite finely striate on the basal half of the middle two-thirds, smooth and polished beyond like the following tergites; hypopygium not surpassing the apex of the last dorsal abdominal segment; ovipositor sheaths slightly more than half as long as the abdomen. Black; palpi blackish at base; antennae, tegulae and wing-bases, black; wings hyaline, very feebly fuliginous on the apical third; veins and stigma brown, the latter with a distinct pale spot at base; all coxae and basal segment of all trochanters black; remainder of legs testaceous, except a very small black spot on the under side of the anterior and middle femora at base, and the extreme apex of the posterior femora and tibiae, and more or less of the posterior tarsi, which are dusky; abdomen wholly black.

*Male*.—As in the female except that the abdomen is a little more slender.

*Type locality*.—Oxnard, California.

*Type*.—Cat. No. 23994, U.S.N.M.

*Hosts*.—*Phlyctaenia ferrugalis* Hübner; *P. operculella* Zeller.

Described from three female and three male specimens reared by R. L. Boyden, from *P. ferrugalis*, in the Bureau of Entomology, under Chittenden No. 3106-02, at Oxnard, California.

There is in the National Collection also a series of three specimens reared by J. E. Graf, from *P. operculella*, at Pasadena, California, under Chittenden No. 2230. I have seen another specimen in Doctor Brues's collection from Los Angeles, California.

#### 25. MICROGASTER EPAGOGES Gahan.

*Microgaster epagoges* GAHAN, Proc. U. S. Nat. Mus., vol. 53, 1917, p. 197.

*Type*.—In the United States National Museum.

Readily placed by use of the characters given in the table to species. Tennessee, Illinois, Indiana, Colorado, Massachusetts, New York.

*Host*.—*Epagoge sulfureana* Clemens.

Besides the type series from Nashville, Tennessee, the National Collection has one specimen reared at Galena, Illinois, and two reared at Lafayette, Indiana, by J. J. Davis, also one specimen labeled "Colo. 2082 Collection C. F. Baker." Doctor Brues's Collection, at Harvard University, contains a single specimen, taken at Forest Hills, Massachusetts, by P. W. Whiting; and the Cornell University Collection has one specimen taken at Ithaca, New York.

## 26. MICROGASTER CONGREGATIFORMIS Viereck.

*Microgaster (Microgaster) congregatiformis* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1917 (1916), p. 202.

*Type*.—In the Connecticut Agricultural Experiment Station.

The characters noted in the key to species will separate this species from *epagoges* and *phthorimaeae*, to which it is most closely allied.

Connecticut, Massachusetts, New York, Canada.

*Host*.—*Physostesia*, species.

A paratype from New Haven, Connecticut, is in the National Collection; also a female specimen, from the same locality, reared by Dr. W. E. Britton, from *Physostesia*, species, July 16, 1918. The collection of Cornell University contains one specimen, from Montreal, Canada; in Doctor Brues's collection there are three specimens from Franklin, Massachusetts; and in that of the American Museum of Natural History there is a single specimen from Long Island, New York, taken by J. L. Zabriskie.

## SPECIES OF MICROGASTER UNKNOWN TO ME.

## MICROGASTER MEXICANA Cameron.

*Microgaster mexicanus* CAMERON, Biol. Cent. Amer. Hym., vol. 1, 1883, p. 397.

*Type*.—Probably in the British Museum.

Mexico, Northern Sonora (Morrison).

This species may not belong to *Microgaster*. Cameron's characterization of the abdomen causes me to suspect that it is a *Microplitis*.

## MICROGASTER LATERALIS Provancher.

*Microgaster lateralis* PROVANCHER, Addit. Faun. Canad. Hymen., 1886, p. 141.

*Type*.—In the Museum of Public Instruction at Quebec.

Point Rouge, Canada.

The notes made by Mr. A. B. Gahan upon this species, after an examination of the type, mention the second intercubitus as being represented merely by a fuscous line, the second cubital cell being open at the apex. This character, together with the long ovipositor and the sculpture of the abdomen, mentioned by Provancher, lead me to doubt that the species is correctly placed. I suspect that it may be an *Apanteles*, possibly falling near *consimilis*.

## SPECIES WRONGLY CLASSIFIED AS MICROGASTER WHICH HAVE NOT PREVIOUSLY BEEN REMOVED FROM THAT GENUS.

## APANTELES UNICOLOR (Curtis).

*Microgaster unicolor* CURTIS, Descr. Insects J. C. Ross, 2d Voyage, 1835, Appendix, p. 62.

*Type*.—Probably in the British Museum. Arctic Regions, North America.

The description given by Curtis is clearly that of an *Apanteles*. Apparently the species falls close to *yakutatensis* Ashmead.

**MICROGASTER BISSTIGMATA Say.**

*Microgaster bistigmata* SAY, Boston Journ. Nat. Hist., vol. 1, 1836, p. 264.

*Type*.—Lost.

Indiana.

This is certainly not a *Microgaster*, since the description states that the radial vein is distinct and complete. It may very well be an *Orgilus*.

(**MICROGASTER TUCKERI Viereck**)=**MICROPLITIS MATURUS Weed.**

*Microplitis maturus* WEED, Trans. Amer. Ent. Soc., vol. 15, 1888, p. 294.

*Microgaster tuckeri* VIERECK, Trans. Kansas Acad. Sci., vol. 19, 1905, p. 274.

*Type*.—In the University of Kansas.

Douglas County, Kansas.

I have not seen the type of *tuckeri*, but Mr. Gahan, in notes made on an examination of the type several years ago, states that it is a *Microplitis*; and according to these notes and Viereck's description, the species agrees in every detail with *maturus* Weed.

**Genus MICROPLITIS Foerster.**

*Microplitis* FOERSTER, Verh. der Naturh. Ver. preuss. Rheinl., vol. 19, 1862, p. 245. *Genotype*.—*Microgaster sordipes* Nees (Monobasic).

Distinguished from *Microgaster* and *Apanteles* by the characters given in the key to genera. Most of the species are properly placed in this genus without difficulty. They have the characters mentioned well-marked, and also have a distinct habitus and are usually of smaller size, but several species, such as *carinatus*, *perplexus*, *coloradensis*, and *stigmaticus* must be very carefully studied before they can be referred to *Microplitis*.

In habits the members of this genus are similar to the species of *Apanteles* and *Microgaster*. All attack lepidopterous larvae, some living as solitary, others as gregarious, parasites within the body of the host. The genus as a whole is probably somewhat more beneficial than *Microgaster*, although it has but few more species, in North America. Noctuid larvae, and more particularly the cutworms, appear to be especially subject to the attacks of species of *Microplitis*.

For the most part the cocoons are different from those of *Apanteles* and *Microgaster*. They are usually parchment-like, often fluted or ribbed, always buff, brown, gray, or greenish in color, and without loose silk. No *Microgaster* cocoon known to me resembles those of *Microplitis*, and the cocoons of only a few species of *Apanteles* can be confused with them.

## KEY TO THE NORTH AMERICAN SPECIES OF MICROPLITIS.

1. Second abdominal tergite emarginate posteriorly, provided with two longitudinal grooves medially, and usually somewhat roughened; stigma large; radius decidedly longer than first intercubitus and usually perpendicular to anterior margin of stigma; inner spur of posterior tibiae always half as long as metatarsus; stigma broad, as long as the metacarpus. Large species, always more than 3 mm. in length----- 2.
- Second abdominal tergite not emarginate posteriorly, nor provided with longitudinal grooves medially; otherwise not combining the above characters ----- 5.
2. First dorsal abdominal plate distinctly narrower at apex than at base; stigma exceedingly large and with a pale spot at base.
  1. *stigmaticus*, new species.  
First dorsal abdominal plate either parallel-sided throughout, or a little broader at apex than at base; stigma unicolorous----- 3.
  3. Face without a distinct median carina extending from antennal fossae to clypeus; legs, including all coxae and femora wholly testaceous.
    2. *rugosus*, new species.  
Face with a distinct median carina extending from antennal fossae to clypeus; at least the posterior coxae and femora partly black----- 4.
    4. Posterior coxae granular and opaque above; second abdominal tergite somewhat roughened laterally; median area on second tergite triangular in outline, and broadest at base; scutellum coarsely rugulose and opaque.
      3. *coloradensis*, new species.  
Posterior coxae smooth and shining above; second abdominal tergite wholly polished, the median area slender, not triangular; scutellum with separate punctures, shining----- 4. *perplexus*, new species.
  5. Metacarpus much longer than stigma; posterior coxae half as long as thorax; propodeum smooth and polished, with a median longitudinal carina; second abdominal tergite short, transverse, somewhat roughened.
    5. *carinatus* Ashmead.  
Metacarpus never longer, usually shorter, than the stigma; posterior coxae never half as long as the thorax; propodeum always rugulose----- 6.
6. First dorsal abdominal plate slightly broader at apex than at base, very rarely not distinctly broader at apex than at base, and then the parapsidal grooves distinctly impressed----- 7.
- First dorsal abdominal plate not at all broader at apex than at base, usually decidedly narrower; if base and apex are of equal breadth, the parapsidal grooves are not at all impressed----- 14.
7. Parapsidal grooves wholly wanting, the mesoscutum and scutellum weakly punctate and shining; length 2.5 mm----- 6. *Kewleyi*, new species.  
Parapsidal grooves distinct; length always more than 3 mm----- 8.
8. Legs, including all coxae, bright testaceous; venter of abdomen mostly testaceous----- 9.  
At least the posterior coxae black; venter usually mostly blackish----- 10.
9. Stigma unicolorous; parapsidal grooves very strongly impressed; scutellum very broad, broader at base than long; first dorsal abdominal plate about one and one-half times its greatest breadth-- 7. *crenulatus* (Provancher).  
Stigma with a large pale spot in the membrane at base; parapsidal grooves fine, and not so strongly impressed; scutellum a little longer than broad at base; first dorsal abdominal plate distinctly twice as long as its greatest breadth----- 8. *mamestrae* Weed.
10. Stigma with a distinct pale spot in the membrane at base; dorsum of abdomen sometimes more or less testaceous beyond second tergite----- 11.

- Stigma unicolorous, very rarely with the costal thickening at base of stigma pale; dorsum of abdomen never testaceous.....12.
11. Abdomen broad and stout; the venter and most of the dorsum beyond second tergite testaceous; tegulae yellow.
9. *quadridentatus* (Provancher).
- Abdomen more slender, wholly black; tegulae usually black.
10. *alaskensis* Ashmead.
12. Tegulae black; all coxae and basal segment of trochanters black; fore wing with a distinct slightly fuliginous patch extending across the first cubital and first discoidal cells..... 11. *autographae*, new species.
- Tegulae yellow..... 13.
13. Fore and middle coxae yellowish; scape testaceous below; parapsidal grooves deep and coarsely roughened..... 12. *hyphantriae* Ashmead.
- All coxae dark brown or black; scape wholly black; parapsidal grooves usually not so deep and coarsely roughened..... 13. *ceratomiae* Riley.
14. Posterior femora short and stout, not more than three times as long as their greatest breadth; vertex, temples, cheeks and mesoscutum smooth and subpolished, with only indistinct, exceedingly minute punctures; temples bulging slightly beyond the line of the eyes; tegulae and all coxae black; remainder of legs bright testaceous; first dorsal abdominal plate twice as long as broad, base and apex of equal breadth, mostly smooth and polished; length more than 3.5 mm..... 15.
- Posterior femora not so stout; otherwise not combining all the above characters..... 16.
15. Wings strongly infumated..... 14. *croceipes* (Cresson).
- Wings hyaline..... 15. *longicaudus*, new species.
16. First dorsal abdominal plate mostly smooth and polished; dorsum of abdomen always black; mesoscutum never with distinct parapsidal grooves..... 17.
- First dorsal abdominal plate largely rugulose, rarely mostly smooth, and then the abdomen is more or less testaceous above, or the parapsidal grooves are distinctly impressed..... 24.
17. Mesoscutum and scutellum only weakly indistinctly punctate and usually very strongly shining; first dorsal abdominal plate about as broad at apex as at base..... 18.
- Mesoscutum and scutellum sharply, often confluent, punctate and opaque; first dorsal abdominal plate distinctly narrower at apex than at base... 19.
18. Scutellum very small, flat, almost polished; legs, except coxae, mostly testaceous; basal segment of antennal flagellum in female, distinctly longer than the second; length not over 2.5 mm..... 16. *gortynae* Riley.
- Scutellum large, convex; middle and posterior femora black; basal segment of antennal flagellum not distinctly longer than the second; length, 3.5 mm..... 17. *nigritus*, new species.
19. Wings clear hyaline or whitish-hyaline; stigma with a large pale spot in the membrane at base; posterior femora mostly testaceous..... 20.
- Wings either slightly fuliginous or hyaline, but if hyaline, posterior femora are black; stigma nearly always unicolorous..... 21.
20. Stigma decidedly more than twice as long as its greatest breadth; tegulae black; face, vertex, temples and cheeks coarsely punctate and opaque.
18. *melianae* Viereck.
- Stigma not more than twice as long as its greatest breadth; tegulae usually yellow; face, vertex, temples and cheeks much more weakly punctate and shining..... 19. *brassicae*, new species.

21. Wings hyaline; posterior femora black; tegulae black or dark brown. 22.  
Wings slightly fuliginous; posterior femora mostly testaceous, occasionally  
somewhat infuscated along edges.----- 23.
22. Stigma unicolorous.----- 20. *plutellae*, new species.  
Stigma with a pale spot at base.----- 21. *coactus* Lundbeck.
23. Scutellum coarsely confluent punctate and opaque; tegulae brown; first  
dorsal abdominal plate parallel-sided to near the apex, from which point  
it narrows suddenly.----- 22. *quintilis* Viereck.  
Scutellum flat, with scattered, well-separated punctures, somewhat shining;  
tegulae yellow, rarely pale brown; first dorsal abdominal plate narrowing  
more gradually from base to apex.----- 23. *feltiae*, new species.
24. Radius perpendicular to anterior margin of stigma and much longer than  
first intercubitus; second dorsal abdominal plate somewhat roughened. 25.  
Radius always strongly directed outward, and usually hardly as long as  
first intercubitus; dorsum of abdomen beyond first segment wholly smooth  
and polished.----- 26.
25. Mesopleural furrow distinct, crenulate; second dorsal abdominal plate very  
weakly roughened posteriorly; third abdominal tergite smooth and pol-  
ished; face very shallowly punctate and shining.  
24. *latistigmus*, new species.  
Mesopleural furrow wanting; second dorsal abdominal plate finely granular  
on basal half, distinctly striate on posterior half, opaque; third tergite  
alutaceous, opaque; face closely sharply punctate and dull.  
25. *striatus*, new species.
26. Metacarpus as long as stigma; all coxae, except extreme base of posterior  
pair, testaceous; first dorsal abdominal plate narrowing very strongly to  
apex; second plate triangular; second and third abdominal tergites largely  
testaceous; length 2.5 mm.----- 26. *varicolor* Viereck.  
Metacarpus not as long as stigma; otherwise not combining all the above  
characters.----- 27.
27. Tegulae and wing-bases black; stigma without a distinct pale spot at base;  
disk of scutellum with a pitted groove just inside the sharp lateral  
margins; abdomen entirely black above and below; all coxae black.  
27. *scutellatus*, new species.  
Tegulae and wing-bases yellow; stigma always with a large pale spot in  
the membrane at base; disc of scutellum normal; abdomen often partly  
testaceous; fore and middle coxae, and often the posterior pair partly,  
yellowish.----- 28.
28. Parapsidal grooves wholly wanting.----- 29.  
Parapsidal grooves rather well indicated.----- 31.
29. Posterior coxae black; length not over 2.5 mm.----- 30.  
Posterior legs, including coxae, testaceous; abdomen with a broad testaceous  
band covering second and third tergites.----- 28. *laticinctus*, new species.
30. First dorsal abdominal plate as broad at apex as at base; second and third  
abdominal tergites and the venter of abdomen usually testaceous.  
29. *confusus*, new species.  
First dorsal abdominal plate distinctly narrower at apex than at base;  
abdomen black, except the broad membranous margins along the two basal  
plates, which are pale.----- 30. *bradleyi*, new species.
31. Mesopleurae mostly polished; posterior coxae reddish-black; dorsum of  
abdomen reddish-black; venter black; length less than 3 mm.  
31. *montanus*, new species.



Mesopleurae largely opaque, with only a small subquadrate polished area; posterior coxae and more or less of the dorsum of abdomen usually testaceous; venter of abdomen always testaceous; length usually 3.5 mm.

32. *maturus* Weed.

1. *MICROPLITIS STIGMATICUS*, new species.

Closely resembles *coloradensis*, from which it differs in the first dorsal abdominal plate being distinctly narrower at apex than at base, in having the mesoscutum and scutellum less coarsely roughened, in the paler legs, and in the stigma being pale at base.

*Female*.—Length 3.2 mm. Face very weakly indistinctly punctate and shining; antennae very slender, a little longer than the body; vertex, temples, and cheeks indistinctly punctate and shining; mesoscutum shallowly, confluent punctate; parapsidal grooves not distinct; scutellum very weakly punctate, shining; mesopleurae punctate anteriorly and below the rather short, finely crenulate, longitudinal furrow, highly polished above it; propodeum sloping gradually from base to apex, finely rugulose, and provided with a median longitudinal carina; stigma exceedingly broad and about as long as metacarpus; radius straight and perpendicular to anterior margin of stigma, longer than the first intercubitus; legs slender; posterior coxae nearly half as long as the thorax, and finely granular above; inner spur of middle tibiae shorter than middle metatarsus; inner spur of posterior tibiae half as long as posterior metatarsus; abdomen slender, a little shorter than the thorax; first dorsal abdominal plate distinctly narrowing to apex, at least twice as long as broad at base, smooth and polished on basal half, finely rugulose beyond; second dorsal abdominal plate long, very weakly roughened, rather shining, and provided with two longitudinal grooves medially; posteriorly the second tergite is decidedly emarginate; the membranous margins along the two basal plates very broad; third and following tergites smooth and shining; hypopygium not surpassing the last dorsal segment; ovipositor sheaths short. Black; palpi pale; antennae brownish-black; tegulae and wing-bases very pale yellow; wings hyaline; costa and base of stigma yellow; legs pale yellow, except the posterior coxae which are black, and the apex of posterior femora, base and apex of posterior tibiae, and more or less of posterior tarsi, which are dusky; abdomen black; the membranous margins along the first and second dorsal plates yellow; venter of abdomen yellowish on the basal half or two-thirds.

*Male*.—Essentially as in the female.

*Type*.—In the collection of Dr. C. T. Brues.

*Type-locality*.—Mount Constitution, Washington.

*Allotype locality*.—Moscow Mountain, Idaho.

*Paratype localities*.—Moscow Mountain, Idaho, and Vancouver, British Columbia.

Described from one female and three male specimens from the collection of Dr. C. T. Brues, at Harvard University. The type, allotype, and one of the paratypes are in Doctor Brues's collection; the other paratype is in the United States National Museum. I have also seen one specimen of this species in the Cornell University Collection, labeled "Goldstream to Downy Creek, Selkirk Mts., Br. Col., Aug. 7-11, '05"; and one in the collection of the Boston Society of Natural History, taken by Mr. C. W. Johnson, on Mount Washington, New Hampshire, at 3,000 feet.

## 2. MICROPLITIS RUGOSUS, new species.

Near *coloradensis*, but differs from that species in being somewhat more coarsely sculptured; in lacking the pronounced median facial carina that, in *coloradensis*, extends from the antennal fossae to the clypeus; in the bright testaceous posterior coxae and femora; and in more or less of the dorsum of the abdomen being reddish-testaceous.

*Male*.—Length 3.5 mm. Face very coarsely rugulose without a distinct median longitudinal carina; vertex, temples, and cheeks roughened like the face; mesoscutum coarsely ruguloso-punctate; the parapsidal furrows present but poorly defined; scutellum strongly rugulose and dull; mesopleurae ruguloso-punctate anteriorly and below the straight, distinctly crenulate, longitudinal furrow, polished above it; propodeum sloping gradually from base to apex, strongly rugoso-reticulate, and provided with a median longitudinal carina; stigma very short and broad, about as long as the metacarpus; radius very slightly directed outward, distinctly longer than first intercutibus; inner spur of middle tibiae a little shorter than middle metatarsus; posterior coxae less than half as long as the thorax; inner spur of posterior tibiae half as long as the posterior metatarsus; abdomen a little shorter than the thorax, depressed; first dorsal abdominal plate parallel-sided, about twice as long as broad, and ruguloso-striate; second abdominal tergite distinctly striate, and provided with a sharply-margined triangular shield medially, that is broadest at the base of the segment; posteriorly the second tergite is strongly emarginate; remainder of the abdomen smooth and shining. Black; antennae testaceous below, brownish above; tegulae and wing bases bright testaceous; wings hyaline; costa yellow; stigma entirely brown; legs, including all coxae and tarsi, testaceous; abdomen more or less reddish on the dorsum, especially on the second and third tergites; basal half of the venter of the abdomen testaceous.

*Type locality*.—Ashland, New Jersey.

*Type*.—In the collection Dr. C. T. Brues, at Harvard University.

Described from a single male specimen labeled "Ashland, N. J., 7-15-'06."

3. *MICROPLITIS COLORADENSIS*, new species.

Very close to *perplexus*, from which it differs in the head and thorax being much more coarsely roughened and dull; in the median area on the second abdominal plate being triangular; in the granular and opaque posterior coxae; and in the fore and middle coxae and the apex of the hind coxae being testaceous.

*Male*.—Length 3.8 mm. Face rugulose and opaque, with a polished median carina extending from the base of the antennae to the base of the clypeus; vertex, temples, and cheeks ruguloso-punctate and dull; mesoscutum opaque, the parapsidal grooves rather well indicated, broad, and rugulose, the lobes of the mesoscutum much more weakly roughened; scutellum convex, coarsely roughened and dull, mesopleurae ruguloso-punctate anteriorly and below the rather broad coarsely crenulate longitudinal furrow, highly polished above it; propodeum rugoso-reticulate, with a prominent median longitudinal carina; stigma broad, about as long as the metacarpus; radius straight, perpendicular to the anterior margin of the stigma and about twice as long as the first transverse cubitus; posterior coxae granular and opaque; inner spur of middle tibiae distinctly shorter than the middle metatarsus; inner spur of posterior tibiae half the length of the posterior metatarsus; abdomen a little shorter than thorax; first dorsal abdominal plate slightly broader at apex than at base and a little more than one and one-half times as long as broad at apex, finely rugulose, except in the middle at base; second abdominal tergite long, narrower at base than at apex, emarginate at apex, and provided with two longitudinal impressed lines medially, which converge posteriorly and enclose a smooth and shining triangular area; suture between second and third tergites not distinct medially; the areas on either side of the triangular median portion of the second tergite opaque and somewhat roughened; third and following tergites smooth and polished. Black; labrum, mandibles, and labial palpi blackish; maxillary palpi fuscous; antennae entirely black; tegulae and wing-bases testaceous; wings hyaline, very slightly fuliginous at apex, the veins and stigma brown; legs, including fore and middle coxae, testaceous; posterior coxae black on basal half, testaceous apically; posterior femora blackish on apical half above; posterior tibiae below and at apex, and the posterior tarsi, infuscated; abdomen entirely black.

*Type locality*.—Colorado.

*Type*.—Cat. No. 24001, U.S.N.M.

Described from three male specimens labeled "Colo. 2082, Collection C. F. Baker."

4. *MICROPLITIS PERPLEXUS*, new species.

Closely resembles *coloradensis*, but differs in having the mesoscutum and scutellum less coarsely roughened and more shining, in the pos-

terior coxae being smooth and shining above, in the entirely polished second abdominal tergite, in the longer abdomen and the darker legs.

*Female*.—Length, 4 mm. Face finely ruguloso-punctate, and somewhat shining, with a distinct polished median carina extending from the base of antennae to base of clypeus; vertex, temples, and cheeks finely confluent punctate; mesoscutum finely ruguloso-punctate, shining; the parapsidal grooves broad, rather well indicated; scutellum slender, closely punctate and shining; mesopleurae punctate anteriorly and below, polished above, and provided with a longitudinal strongly crenulate furrow; propodeum coarsely rugose, with a median longitudinal carina; stigma broad and about as long as the metacarpus; radius perpendicular to anterior margin of stigma, much longer than first transverse cubitus; posterior coxae distinctly less than half as long as the thorax, entirely smooth and subpolished; inner spur of posterior tibiae half as long as the metatarsus; abdomen long and slender, at least as long as the thorax, with a rather pronounced ventral keel; the first dorsal plate narrow, parallel-sided, twice as long as broad, smooth and polished on basal half, finely striate on posterior half; second tergite long, much narrower at base than at apex, the sides oblique on basal half, parallel on the apical half, and provided with two parallel longitudinal grooves medially which enclose a slender median area; the second and following tergites entirely polished; ovipositor sheaths slightly exerted. Black; labrum reddish; palpi dusky; antennae entirely black; tegulae yellowish; wings hyaline, weakly infumated at apex; veins and stigma dark brown; legs reddish-testaceous; posterior tibiae and tarsi somewhat infuscated; abdomen entirely black; ovipositor sheaths black.

*Type locality*.—Indiana.

*Type*.—Cat. No. 24000, U.S.N.M.

Described from one female labeled "Ind. 2090, Collection C. F. Baker." I have seen another female specimen, in the collection of the Boston Society of Natural History, taken by Mr. C. W. Johnson, at Hampden, Maine; and three specimens in the Cornell University Collection: one from Carbonate, British Columbia (J. C. Bradley), and two from Waubamic, Ontario (H. S. Parish).

##### 5. MICROPLITIS CARINATUS Ashmead.

*Microplitis carinata* ASHMEAD, Trans. London Ent. Soc., 1900, p. 293.

*Type*.—In the United States National Museum.

St. Vincent.

This species has the habitus and particular characters of an *Apanteles*, but because of the presence of the second intercubitus it must be retained in *Microplitis*. The propodeum, save for the median longitudinal carina, is perfectly smooth; the first dorsal abdominal plate

is very long and narrow, parallel-sided, and truncate at apex; and the second plate is short, transverse, and partly aciculate.

The type is the only specimen of this species that I have seen.

6. *MICROPLITIS KEWLEYI*, new species.

Very similar to *confusus*, which species it also resembles in the cocoons and the type of host attacked. The adult differs from *confusus* in the first dorsal abdominal plate being distinctly a little broader at apex than at base; in the more weakly punctate and strongly shining mesoscutum and scutellum, and in the dorsum of the abdomen being wholly black.

*Female*.—Length 2.5 mm. Face closely minutely punctate, shining medially; clypeus weakly punctate and shining; vertex, temple and cheeks distinctly closely punctate; antennae much shorter than the body; mesoscutum with numerous irregular punctures, strongly shining; scutellum impunctate, polished on the disk; mesopleurae punctate and shining below and in front of the crenulate furrow, perfectly smooth and highly polished above it; propodeum coarsely rugoso-reticulate, with a prominent median longitudinal carina; metacarpus shorter than stigma; radius hardly as long as first inter-cubitus; legs slender; spurs of posterior tibiae about equal in length, and much less than half as long as metatarsus; abdomen almost as long as thorax; first dorsal abdominal plate broadening slightly posteriorly, distinctly broader at apex than at base, truncate at apex, mostly smooth and shining, having only a few very weak striae at the sides; remainder of dorsum of abdomen very highly polished; ovipositor subexserted; the hypopygium not surpassing apex of last dorsal segment. Black; labrum brown; antennae often testaceous beneath on the basal two-thirds, brown on the apical third; tegulae pale; wing-bases darker; wings subhyaline, the veins and stigma light brown, the latter yellowish and transparent on basal third; legs yellowish-brown; posterior coxae black; abdomen piceous black; the membranous margins along the two basal plates dingy ferruginous.

*Male*.—Like the female, except for the usual secondary sexual differences.

*Cocoons*.—3.2 mm. in length; cylindrical; plain, without longitudinal ridges; pale dirty brownish; gregarious.

*Type locality*.—College Park, Maryland.

*Type*.—Cat. No. 23998, U.S.N.M.

*Hosts*.—"Cutworms;" *Euxoa*, species.

Described from eighteen female and two male specimens reared from a cutworm by R. J. Kewley, in the Bureau of Entomology, under Cage No. B86G, at College Park, Maryland. In addition to the type series the National Collection contains many specimens, for the most part reared from cutworms, from the following localities: College

Park, Maryland (R. J. Kewley and J. Feighenne); Trout Lake, Wisconsin (J. J. Davis), Muscatine, Iowa (D. M. Wadley). One specimen is from Battle Creek, Michigan, reared from *Euxoa*, species by Mr. Satterthwaite, under Webster No. 13498, June 22, 1914. There are also two collected specimens, one from Canada, and one from Washington, District of Columbia. Doctor Brues's collection, at Harvard University, contains two specimens, collected by A. L. Melander, at Geneva, New York; and the Cornell Collection has one specimen taken at Ithaca, New York, by F. W. Petty.

#### 7. MICROPLITIS CRENULATUS (Provancher).

*Microgaster crenulatus* PROVANCHER, Addit. Faun. Canad. Hymen., 1888, p. 387.

*Type*.—In the Museum of Public Instruction, at Quebec, Canada; Massachusetts.

This species is very similar to *mamestrae*, but I believe it to be distinct. It can be readily separated from that species by the characters noted in the key.

I have seen only two specimens: one, in the National Collection, without locality data, but with the note, "cocoon found on base of water lily;" and one, in Doctor Brues's collection, taken at Manomet, Massachusetts, by J. A. Cushman.

#### 8. MICROPLITIS MAMESTRAE Weed.

*Microplitis mamestrae* WEED, Bull. Ill. State Lab. Nat. Hist., No. 3, 1887, p. 2.

*Type*.—Probably in the Illinois State Laboratory of Natural History.

Illinois; New York; Michigan; Ohio; Massachusetts; New Jersey.

*Host*.—*Mamestra picta* Harris.

*Cocoon*.—Solitary; reddish-brown; angular; 5 mm. in length.

Although I have not seen the type, the species is so distinct, and so well characterized in the original description, that it cannot be confused. The peculiar cocoon, characteristic of this species, is also well described by Weed.

The parapsidal furrows are fine, but distinct; scutellum long, longer than broad at base; stigma with a large pale spot at base; all coxae testaceous; abdomen broad, black above; the first tergite long, usually at least twice as long as its greatest breadth, normally very slightly broader at apex than at extreme base.

The National Collection contains material from the following localities: Albany, New York (J. A. Lintner, from *Mamestra picta*); Illinois (S. A. Forbes); Agricultural College, Michigan (C. F. Baker); Columbus, Ohio; West Springfield, Massachusetts (H. E.



Smith). Doctor Brues's collection has one specimen from Trenton, New Jersey; that of Cornell University, one from Dryden, New York, and one from Caroline-Hartford, New York. At the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts, there are four specimens reared by R. T. Webber, from *Mamestra picta*, under Gipsy Moth Laboratory No. 12123; the host larvae were taken at Melrose Highlands, Lynnfield, and Acton, Massachusetts.

#### 9. MICROPLITIS QUADRIDENTATUS (Provancher).

*Microgaster quadridentatus* PROVANCHER, Addit. Faun. Canad. Hymen., 1886, p. 140.

*Microplitis terminatus* WEED, Trans. Amer. Ent. Soc., vol. 15, 1888, p. 295.

*Type*.—In the Museum of Public Instruction, at Quebec; that of *terminatus* is in the Philadelphia Academy of Natural Sciences.

Canada; Illinois; Massachusetts; New Hampshire; Maine, New York.

*Host*.—*Arsilonche albovenosa* Goeze.

*Cocoons*.—4.5 mm. long; broad; not fluted; pale grayish-brown in color; and provided with some loose silk at the sides.

This species is a very well-marked one, not easily confused with any other known species. It is sufficiently well characterized in the table to species.

Besides the four specimens constituting the type series of *terminatus*, which are in the Philadelphia Academy of Sciences, I have seen the following material: in the United States National Museum, specimens from Franconia, New Hampshire (Mrs. A. T. Slosson); "Maine"; Canada (C. F. Baker), and two specimens without locality data; in the Cornell University Collection, one specimen from Ithaca, New York; one from Laval County, Quebec, and one from Montreal, Canada; in Doctor Brues's collection, two specimens from Essex County, Massachusetts.

#### 10. MICROPLITIS ALASKENSIS Ashmead.

*Microplitis alaskensis* ASHMEAD, Proc. Wash. Acad. Sci., vol. 4, 1902, p. 249.

*Type*.—In the United States National Museum.

Alaska; Washington; Oregon; Colorado; California; Montana; Kansas; Illinois; Massachusetts; New York; British Columbia, Ontario, and Nova Scotia, Canada.

*Host*.—*Hadena procincta* Grote; *Plusia*, species.

*Cocoons*.—4.5 mm. in length; ribbed; tapering strongly toward one end, less so toward the other; greenish in color; apparently solitary.

The characters noted in the table to species will suffice for distinguishing this widely distributed form from related species.

Besides the type, from Juneau, Alaska, the National Collection contains many specimens from diverse localities: from Pullman,

Washington (J. A. Hyslop, reared from *Plusia*, species, in the Bureau of Entomology, under Webster Nos. 4595 and 5903); Mount Hood, Oregon; Colorado (C. F. Baker); Los Angeles, California; Santa Cruz Mountains, California; Champaign, Illinois; Boston, Massachusetts; Vancouver, British Columbia (reared from *Hadena procincta* Grote by J. M. Langston). The collection of the Boston Society of Natural History has one specimen from S. W. Harbor, Maine; Doctor Brues's collection contains specimens from Wathena, Kansas (W. M. Mann); Pullman, Washington (A. L. Melander); Florissant, Colorado (S. A. Rohwer); Lake McDonald, Glacier Park, Montana (A. L. Melander); and in the Cornell University Collection there is material from Ithaca, New York; Waubanic, Ontario (H. S. Parish); Truro, Nova Scotia; Carbonate and Downie Creek, British Columbia, Canada (J. C. Bradley).

11. MICROPLITIS AUTOGRAPHAE, new species.

Resembles *alaskensis* in size and color and general appearance, but differs from that species in the unicolorous stigma, in the perfectly smooth and polished second abdominal tergite, and in the relatively shorter and broader abdomen. The cocoons of the two species also are very similar, but they differ in color, those of *alaskensis* being pale green, while those of the present species are light brown.

*Female*.—Length, 3.5 mm. Head transverse; face closely coarsely punctate and dull; clypeus more feebly punctured, somewhat shining; vertex temples and cheeks punctate and dull, although less so than the face; mesoscutum and scutellum strongly shining, indistinctly punctate; the parapsidal furrows, which are well-marked, and the broad depression posteriorly on the mesoscutum, irregularly roughened but shining; a distinct median carina on the mesoscutum posteriorly; mesopleurae punctate and dull anteriorly and below, smooth and polished above, and provided with a longitudinal slightly curved crenate furrow; propodeum very coarsely reticulated, with a prominent median longitudinal carina; the stigma large; the radius no longer than the first transverse cubitus, the second cubital cell being large; legs slender, spurs of posterior tibiae about equal in length, distinctly less than half as long as the metatarsus; abdomen narrow at base, broad posteriorly; the first dorsal abdominal plate broadening slightly behind, a little more than one and one-half times as long as broad at apex, finely rugulose, with a longitudinal groove medially on the basal two-thirds; remainder of the dorsum of the abdomen highly polished; ovipositor very slightly exerted; hypopygium not attaining the apex of the abdomen. Black; clypeus, labrum, and basal segment of labial palpi, black; antennae entirely and the tegulae and wing-bases black; wings slightly fuliginous, the veins and entire stigma dark brown; all coxae and basal segment of all trochanters black; remainder of the legs testaceous, except the tarsi, which are

more or less dusky; abdomen entirely black, except the membranous margins along the first dorsal plate, which are brown.

*Male*.—Essentially as in the female.

*Cocoons*.—5 mm. long; leathery, elliptical, tapering strongly toward both ends, and provided with a number of fine striations; color light brown.

*Type locality*.—Maxwell, New Mexico.

*Type*.—Cat. No. 24002, U.S.N.M.

Described from three female and one male specimens, reared by D. J. Caffrey, June 4, 1915, from *Autographa californica* Speyer, in the Bureau of Entomology, under Webster No. 11135.

#### 12. MICROPLITIS HYPHANTRIAE Ashmend.

*Microplitis hyphantriae* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1898 (1897), p. 164.

*Type*.—In the United States National Museum.

Illinois; Massachusetts; Arkansas; Texas; Missouri; Michigan; Maryland; Ohio; New York; Indiana; Ontario; Canada.

*Hosts*.—*Hyphantria cunea* Drury; *Xylina*, species; *Apatela furcifera* Guenée; *Acronycta hasta* Guenée.

*Cocoon*.—3.5 mm. long, brownish, not ribbed, apparently solitary.

The species is exceedingly close to *ceratomiae*, but can be satisfactorily distinguished by use of the group of characters given in the foregoing table.

In addition to the type series the National Collection has the following material: One reared from *Xylina*, species, by D. Isley, at Bentonville, Arkansas, under Quaintance No. 16336; one from Texas, from the Belfrage Collection; one reared from a noctuid larva in Missouri; one reared from *Apatela furcifera* at Sullivan, Indiana, in the Bureau of Entomology, under No. 143 L<sup>o</sup>; and collected specimens from Maryland; Wooster, Ohio; Canada, and Michigan (C. F. Baker), and Algonquin, Illinois. The Cornell University Collection has several specimens from Chicopee, Massachusetts; Wau-bamic, Ontario, Canada (H. S. Parish); and Ithaca, New York. I have also seen one specimen from the collection of the American Museum of Natural History, reared from *Acronycta hasta*, by J. A. Grossbeck. The collection of the Gipsy Moth Laboratory, at Melrose Highlands, Massachusetts, has one specimen from Tewksbury, Massachusetts.

#### 13. MICROPLITIS CERATOMIAE Riley.

*Microplitis ceratomiae*, RILEY, Trans. St. Louis Acad. Sci., vol. 4, 1881, p. 303.

*Microplitis waldeni* VIERECK, Bull. 22. Conn. State Geol. and Nat. Hist. Survey, 1917 (1916), pp. 203, 204.

*Type*.—In the United States National Museum; type of *waldeni* is in the Connecticut State Agricultural Experiment Station, at New Haven.

Missouri; Connecticut; Massachusetts; Maine; New York; Colorado; Michigan; Canada.

*Hosts*.—*Ceratomia amyntor* Geyer; *Paonias excaecatus* Smith and Abbot; *Sphinx drupiferarum* Smith and Abbot; *Sphinx gordius* Stoll. Apparently a general parasite on the larvae of Sphingidae, issuing when the hosts are nearly full grown.

*Cocoons*.—About 3.5–4 mm. in length; brown; with several longitudinal ribs; gregarious, more or less cemented together.

After studying the type of *waldeni*, I find it to agree perfectly with *ceratomiae*. As noted under *hyphantriae*, *ceratomiae* is closely allied to that species, and is sometimes separated with difficulty.

The National Collection contains, in addition to the types of *ceratomiae*, numerous specimens from the following localities: Springfield, Massachusetts; Agricultural College, Michigan; Ottawa, Canada (reared from *Ceratomia amyntor* by Fletcher); Lincolnville, Maine (reared from *Sphinx gordius*, by H. G. Dyar); New Hampshire; Michigan and Colorado (C. F. Baker). In Dr. Brues's collection I have seen a series of specimens of this species reared from a sphingid larva taken at Forest Hills, Massachusetts; also three specimens taken at Machias, Maine, by Mr. C. W. Johnson. The collection at Cornell University contains specimens from Wilmington, New York; and Truro, Nova Scotia (R. Matheson); and that of the Boston Society of Natural History, one specimen from Bar Harbor, Maine.

#### 14. MICROPLITIS CROCEIPES (Cresson).

*Microgaster croceipes* CRESSON, Trans. Amer. Ent. Soc., vol. 4. 1872, p. 183.

*Microplitis nigripennis* ASHMEAD, Bull. 50, U. S. Dep. Agr., Bur. Ent., 1905, p. 122, fig. 23.

*Type*.—In the United States National Museum. Location of types of *nigripennis* unknown.

Texas; Alabama; Mississippi; Arkansas; New Mexico; Colorado; Kansas; Tennessee; Virginia; Illinois; New Jersey.

*Hosts*.—*Heliothis obsoleta* Fabricius; *Chloridea virescens* Fabricius.

*Cocoons*.—6 mm. in length; cylindrical; pale brownish; longitudinally ribbed; solitary.

A large, very shining species; head and mesonotum with exceedingly minute, setiform punctures; wings strongly infumated; posterior femora short and stout; abdomen wholly smooth and shining.

In addition to the types of *croceipes* there are many specimens in the National Collection from various localities: from Virginia; Southern Illinois (Robertson); Mesilla, Lone Mountain, and Las Cruces, New Mexico (Cockerell); Colorado (C. F. Baker); Wellington, Kansas (reared from *Heliothis*, species, by W. E. Pennington and H. T. Osborn, under Webster No. 5458); Knoxville, Ten-

nessee (reared by C. C. Hill, from *Heliothis obsoleta*, under Webster No. 9136); Brownsville, Texas (reared from *H. obsoleta*, by R. A. Vickery, under Webster No. 6437); Clarksville, Tennessee (reared from *Chloridea virescens*, by F. C. Liles). The Cornell Collection has two specimens from Palisades, New Jersey.

15. *MICROPLITIS LONGICAUDUS*, new species.

Nearest *croceipes*, with which it agrees in the smooth, almost impunctate head and mesoscutum, in the short and stout posterior femora, and the slightly bulging posterior orbits; it differs from that species in its hyaline wings and longer ovipositor.

*Female*.—Length 3.8 mm. Head with the face distinctly though very shallowly punctate, rather shining, the clypeus impunctate and polished; vertex, temples, and cheeks practically impunctate, subpolished; the temples bulging slightly beyond the line of the eyes; antennae much shorter than the body; mesoscutum virtually impunctate, subpolished, pubescent; scutellum with indistinct setigerous punctures, shining; mesopleurae with a sharply marked, curved longitudinal crenulate furrow, mostly polished, minutely indistinctly punctate below the furrow and anteriorly; propodeum coarsely rugose, with a prominent median longitudinal carina; fore wing with the radius directed outward, very slightly longer than the transverse cubitus; stigma longer than the metacarpus; posterior femora very short and stout, less than two and one-half times as long as their greatest breadth; posterior tibial spurs short, subequal, decidedly shorter than half the metatarsus; last segment of posterior tarsi twice as long as the preceding segment; abdomen as long as the thorax, rather stout; the first dorsal plate parallel-sided, apex and base of equal breadth, more than twice as long as broad, and mostly smooth and polished; the membranous margins rather broad along apical third of first plate; remainder of the abdomen polished; hypopygium large, prominent, very slightly surpassing the apex of the last dorsal segment; ovipositor sheaths truncate at apex, projecting nearly half the length of the abdomen. Black; clypeus reddish; palpi pale; antennae wholly black; tegulae and wing-bases black; wings hyaline, with an indistinct infumated patch just below stigma; veins yellowish-brown; stigma dark brown, with a large pale spot at base; legs, except the black coxae and basal segment of trochanters, dark testaceous; abdomen black, except the membranous margins along the first dorsal plate, which are pale; ovipositor sheaths black.

*Type locality*.—Colorado.

*Type*.—Cat. No. 23997, U.S.N.M.

Described from one female specimen labeled, "Colo. 1414. Collection C. F. Baker."

## 16. MICROPLITIS GORTYNAE Riley.

*Microplitis gortynae* RILEY, Trans. St. Louis Acad. Sci., vol. 4, 1881, p. 304.

*Type*.—In the United States National Museum.

Iowa, Missouri, New York, Virginia, Colorado.

*Hosts*.—*Achatodes zae* Harris; *Hydroecia immanis* Grote; *Papaipema nebris* Guenée.

*Cocoons*.—Reddish-brown; longitudinally ribbed, the ribs lighter in color; gregarious, held together in irregular masses.

A very small, smooth and shining species, with an unusually small, flat, and smooth scutellum; antennae short; body black, except the membranous margins along the two basal abdominal plates.

The National Collection contains, besides the types, eight specimens reared by Miss Mary E. Murtfeldt, at Kirkwood, Missouri, from *Achatodes zae*; two specimens reared at Waterville, New York, from *Hydroecia immanis*, by I. M. Hawley; a large series, from Rye, New York, reared by H. Bird, from *Papaipema nebris*, and collected specimens from Colorado, and Arlington, Virginia.

## 17. MICROPLITIS NIGRITUS, new species.

Closely related to *croceipes*, from which it differs in the subhyaline wings, and in the much more slender and black posterior femora.

*Female*.—Length 4 mm.; face minutely, closely punctate and somewhat opaque; the front, vertex and temples, practically impunctate, subpolished, the temples bulging distinctly a little beyond the line of the eyes; antennae much shorter than the body; mesoscutum smooth and very strongly shining, with only very shallow, exceedingly minute punctures; mesopleurae mostly polished, having only a small punctate area anteriorly, and provided with a long curved longitudinal crenulate furrow; propodeum rugoso-reticulate, with a prominent median longitudinal carina; stigma a little longer than the metacarpus; radius arising slightly before the middle of the stigma and strongly directed outward, no longer than the 1st transverse cubitus; posterior coxae very short; the posterior femora slender; spurs of posterior tibiae a little shorter than half the metatarsus; abdomen at least as long as the thorax, rather slender; the 1st dorsal abdominal plate narrow, parallel-sided, nearly three times as long as broad, base and apex apparently of equal breadth, smooth and polished medially with indistinct roughening at the sides; 2d tergite, like the following segments, smooth and polished; hypopygium not surpassing the apex of the abdomen; ovipositor sheaths about one-fifth as long as the abdomen. Black; mouth parts, including the palpi, piceous; antennae and the tegulae black; wings subhyaline, veins and stigma brown, the latter with an indistinctly paler spot at base; all coxae, basal third of fore femora, and basal two-thirds of middle and posterior femora, black; posterior tibiae



testaceous, with a narrow annulus near base and the apical third, dusky; abdomen wholly black, except the membranous margins along the 1st tergite which are dark reddish-brown.

*Male*.—Differs from the female only in the much longer antennae, the shorter abdomen, and the entirely black posterior femora.

*Type locality*.—Colorado.

*Type*.—Cat. No. 24003, U.S.N.M.

Described from 1 female specimen labeled "Colo. 1080, Collection C. F. Baker," and 4 male specimens from the Baker Collection, bearing the following numbers: Colo. 2076 (2 specimens); Colo. 1330; and Colo. 1329.

#### 18. MICROPLITIS MELIANAE Viereck.

*Microplitis melianae* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 185.

*Type*.—In the United States National Museum.

Iowa; Kansas; Illinois; Tennessee; New York; Canada.

*Hosts*.—*Meliana albilinea* Hübner (Viereck); *Cirphis unipuncta* Haworth.

*Cocoons*.—About 3.5 mm. long; brown; not ribbed; evidently gregarious, but not cemented together.

This species, while very close to *brassicae*, can be separated from that species by the characters noted in the key.

Besides the types, there is in the National Collection material from the following localities: Riley County, Kansas; Long Island, New York; Champaign, Illinois; Douglas County, Kansas; Nashville, Tennessee (C. C. Hill); and a specimen, without locality data, reared from *Cirphis unipuncta*. Doctor Brues's collection has a single specimen from Chicago, Illinois; and in the Cornell University collection there are two specimens, from Caroline-Hartford, and Axton, New York.

#### 19. MICROPLITIS BRASSICAE, new species.

Very closely resembles *melianae*; but it can be readily distinguished from that species by the longer stigma, which is also more contrastingly pale on the basal third; the posterior tibiae are slightly dusky at extreme base in *brassicae*, not so in *melianae*; also the head is more coarsely punctate and opaque in the latter.

*Female*.—Length 2.7 mm. Face, vertex and temples very minutely punctate, somewhat shining; antennae as long as the body; mesoscutum and scutellum shallowly punctate and opaque, the latter decidedly convex; mesopleurae finely punctate and dull, with rather long, thick pubescence anteriorly and below the longitudinal crenulate furrow, impunctate and highly polished above; propodeum rugose, with a median longitudinal carina; stigma large, distinctly longer than the metacarpus, and decidedly more than twice as long as its greatest breadth; radius strongly directed outward, hardly

longer than the first intercubitus; legs slender; the posterior coxae very short; spurs of posterior tibiae much less than half as long as the metatarsus; abdomen ovate, depressed, narrow at base, very broad on the third tergite; first dorsal abdominal plate slender, distinctly broader at base than at apex, and more than three times as long as broad at apex, wholly smooth and polished; second dorsal plate rather triangular, narrow at base, but near the apex broadening suddenly to the lateral margins of the abdomen, and like the following tergites, smooth and polished; membranous margins along the first and second plates very broad; hypopygium not reaching apex of abdomen; ovipositor subexserted. Black; palpi yellow; clypeus and mandibles brownish-black; antennae entirely black; tegulae testaceous; wings rather whitish-hyaline; veins and stigma brown, the latter with a very large pale spot in the membrane at base; legs testaceous, except all coxae, which are black, and the extreme apex of posterior femora, the base and apex of posterior tibiae, and all the tarsi, which are more or less fuscous; abdomen mostly deep reddish-black on the basal half, black beyond.

*Male*.—Like the female, except that the tegulae usually are blackish.

*Type locality*.—Rocky Ford, Colorado.

*Type*.—Cat. No. 24004, U.S.N.M.

*Host*.—*Autographa brassicae* Speyer.

Described from three female and one male specimens reared by H. O. Marsh, from August 17 to September 3, 1914, under Chittenden No. 953.

Besides the type series the National Collection contains the following material: one specimen reared from the same host as the type series, at Brownsville, Texas, by R. A. Vickery, under Webster No. 6458; one specimen labeled "Las Cruces, N. Mex., June 25, 1895, Cockerell;" one from Southern California; and one from Arizona (C. F. Baker).

#### 20. MICROPLITIS PLUTELLAE, new species.

Somewhat resembles *melinae*; but differs in its smaller size, unicolorous stigma, darker legs, and the more prominent ovipositor.

*Female*.—Length 2.2 mm. Face a little longer and narrower than usual in this genus, and together with the vertex, temples, and cheeks, finely punctate and opaque; antennae about as long as the body; mesoscutum and scutellum closely punctate and dull; mesopleurae punctate and dull anteriorly and below the finely crenulate longitudinal furrow, highly polished above it; propodeum coarsely rugose, with a distinct median longitudinal carina, rather shining; stigma long, distinctly longer than the metacarpus; radius short, apparently a little shorter than the first intercubitus, and shorter than the

stigma is broad; posterior coxae smooth and shining; posterior femora slender; spurs of posterior tibiae much less than half as long as the metatarsus; abdomen depressed, ovate, a little shorter than the thorax, and broadest at the base of the third segment; the first dorsal abdominal plate slender, narrowing gradually posteriorly, distinctly narrower at apex than at base, smooth and very shining, somewhat polished medially; second dorsal abdominal plate narrow on basal half, broadening suddenly to the lateral margins of the abdomen in the middle of the segment; the membranous margins along the first and the basal half of the second abdominal plates very broad; second and following tergites smooth and polished; hypopygium prominent but not surpassing the apex of the last dorsal abdominal segment; ovipositor sheaths slender, strongly shining, projecting nearly one-fourth the length of the abdomen. Black; palpi dusky at base, labrum and mandibles dark brown; clypeus black; antennae, tegulae and wing-bases black; wings hyaline, the veins, and the stigma entirely, brown; all coxae and trochanters, basal third of fore femora, basal two-thirds of the middle femora, and the posterior femora entirely, black or blackish; tibiae testaceous, but more or less infuscated on the outer side and at apex; tarsi fuscous; abdomen black; the lateral membranous margins on the two basal plates blackish; hypopygium dark brown; ovipositor sheaths brownish-black.

*Male*.—Essentially as in the female.

*Cocoon*.—2.5 mm. long; smooth, brown, covered with a very little loose silk; apparently solitary.

*Type locality*.—Rocky Ford, Colorado.

*Type*.—Cat. No. 24006, U.S.N.M.

*Host*.—*Plutella maculipennis* Curtis.

Described from four females and one male, reared from the above host, June 22 to July 18, 1916, at Rocky Ford, Colorado, by H. O. Marsh, under Chittenden No. 1584.

There are in the United States National Museum four other specimens of this species, from Los Angeles County, California, reared from the same host, and one specimen from the C. F. Baker Collection, labeled "Colo. 1228."

#### 21. MICROPLITIS COACTUS Lundbeck.

*Microplitis coactus* LUNDBECK, Vid. Medd. naturh. Foren Kjobenhavn, 1896, p. 243.

*Type*.—I am not sure of the location of the type of this species. It is probably in some European collection.

Greenland.

*Host*.—*Noctua*, species.

A small species, apparently very similar to *plutellae*, from which it can be separated by the characters listed in the key. Mesoscutum

and scutellum punctate; tegulae brown; wings hyaline, veins and stigma brown, the latter pale at base; coxae, the base of fore and middle femora, and posterior femora almost entirely, blackish; abdomen black, smooth, shining; the first tergite slender, and narrowest at apex.

*Cocoon*.—"Pale grayish-brown, oblong, cylindrical, woolly, 4 mm. in length."

I have seen no specimens of this species. The above notes are taken from the original description.

## 22. MICROPLITIS QUINTILIS Viereck.

*Microplitis quintilis* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1917 (1916), p. 204.

*Type*.—In the Connecticut Agricultural Experiment Station, in New Haven, Connecticut.

Very similar to *feltiae*, but has scutellum less coarsely roughened; the tegulae are brown; and the first tergite does not narrow so gradually posteriorly. Vertex and temples closely punctate and dull; mesoscutum very dull, and closely punctate in the region where parapsidal grooves would be if present; wings very slightly fuliginous; radius no longer than first intercubitus; stigma wholly brown, without a pale spot at base; all coxae and basal trochanters black; apex of posterior femora and tibiae, and the posterior tarsi dusky; abdomen shorter than thorax; first dorsal abdominal plate slender, narrowing abruptly near apex; this plate is very minutely striate at the sides; remainder of abdomen smooth and shining; venter of abdomen, as well as the dorsum, black.

Known only from the unique male type, from which the above notes were made.

## 23. MICROGASTER FELTIAE, new species.

Related to *plutellae*, but is at once distinguished by its somewhat larger size, by the paler legs and tegulae, and the slightly infumated wings.

*Male*.—Length, 2.8 mm. Face, vertex, temples and cheeks strongly closely punctate and opaque; antennae longer than the body; mesoscutum confluent punctate and opaque, without parapsidal grooves; scutellum with separate, distinct punctures, rather flat; mesopleurae coarsely confluent punctate anteriorly and below the longitudinal crenulate furrow, smooth and polished above it; propodeum coarsely rugoso-reticulate, with a prominent median longitudinal carina; stigma a little longer than metacarpus; radius hardly as long as first intercubitus, and strongly directed outward; legs slender; inner spur of posterior tibiae a little longer than the outer, but less than half as long as the metatarsus; abdomen shorter than the thorax, ovate, de-

pressed; first dorsal abdominal plate slender, decidedly narrower at apex than at base, and more than three times as long as broad at apex, mostly smooth and shining; second abdominal tergite broad, and like the following, smooth and polished; membranous margins along the first plate and the extreme base of the second, very broad. Black; basal segments of both labial and maxillary palpi dusky, the remainder yellowish; mandibles reddish-brown; labrum testaceous; tegulae testaceous; the wing-bases spotted with blackish; wings very slightly infumated, the veins and stigma brown, the latter with an indistinctly paler spot at base; fore and middle coxae brown; posterior coxae blackish; remainder of legs yellowish-brown, the fore and middle femora at base, and the posterior femora along the upper edge infuscated; the middle and posterior tibiae and all the tarsi more or less infuscated; abdomen black above and below; the membranous margins along the basal plates brown.

*Cocoons*.—4 mm. long; cylindrical; pergamentaceous; not ribbed; light brown in color; solitary.

*Type locality*.—Nashville, Tennessee.

*Paratype locality*.—Brownsville, Texas.

*Type*.—Cat. No. 24005, U.S.N.M.

*Hosts*.—*Feltia gladiaria* Morrison; *F. annexa* Treitschke; cutworm.

Described from two male specimens: one (type) reared from *Feltia gladiaria*, May, 1913, at Nashville, Tennessee, by C. C. Hill, under Webster No. 12398; the other (paratype) reared from *F. annexa* at Brownsville, Texas, on June 18, 1914, by R. A. Vickery, under Webster No. 5751.

In addition to the type specimens there is in the National Collection the following material of this species: one specimen reared from a cutworm, at Lafayette, Indiana, May 30, 1917, by J. J. Davis; four from Victoria, Texas, J. D. Mitchell, Collector; many specimens from the C. F. Baker Collection, bearing the state labels: Colorado; Arizona; Alabama; Kansas; Louisiana. I have also seen two specimens in Doctor Brues's collection, one from Pullman, Washington, and one from Lake Waha, Idaho.

#### 24. MICROPLITIS LATISTIGMUS, new species.

Close to *striatus*, from which it differs, however, in possessing a distinct crenulate mesopleural furrow; in the longer antennae; in the head being only weakly punctate and shining; and in the smooth and polished third abdominal tergite.

*Female*.—Length 3 mm. Face, including clypeus, very shallowly punctate and shining; vertex smooth, polished; temples and cheeks very weakly punctate and shining; antennae very long, considerably longer than the body; mesoscutum and scutellum entirely closely

deeply punctate and opaque; parapsidal grooves wanting; scutellum apparently about as broad at base as long down the middle and decidedly convex; mesopleurae closely punctate and dull anteriorly and below the broad, coarsely crenulate longitudinal furrow, mostly smooth and highly polished above it; propodeum coarsely reticulate, with a prominent median longitudinal carina; stigma about as long as metacarpus, and very broad; radius perpendicular to anterior margin of the stigma, and much longer than the first intercubitus; posterior coxae smooth; their femora stout; spurs of posterior tibiae nearly equal in length, and about one-third as long as the metatarsus; abdomen a little shorter than the thorax; first dorsal abdominal plate long, broadest at base, narrowing very strongly toward apex, where it is hardly half as broad as at base, mostly finely rugulose and opaque; second plate well defined, triangular, as broad at base as first plate is broad at apex, twice as long down the middle and four times as broad at apex as broad at base, very weakly striate posteriorly in the middle, and somewhat embossed medially; the following tergites smooth and polished; hypopygium extending a little beyond the apex of the last dorsal abdominal segment; ovipositor sheaths projecting slightly. Black; face entirely black; mandibles honey-yellow, except at tips; palpi pale stramineous; scape and pedicel of antennae mostly testaceous, the flagellum brownish-black; tegulae and wing bases yellow; wings hyaline; the veins and the stigma entirely dark brown; legs honey-yellow, except the posterior coxae, which are dark reddish-brown on the basal two-thirds, and the posterior tibiae and tarsi, which are practically entirely fuscous; dorsum of the abdomen black, except the broad membranous margins along the two basal plates, which are very pale yellow; venter of abdomen pale on the basal half, black beyond.

*Cocoon*.—4 mm. in length; cylindrical; bright reddish-brown; not ribbed; provided with a very little loose silk; apparently solitary.

*Type locality*.—Hagerstown, Maryland.

*Type*.—Cat. No. 24007, U.S.N.M.

*Host*.—"Lepidopterous larva."

Described from a single specimen reared by W. E. Pennington, at Hagerstown, Maryland.

#### 25. MICROPLITIS STRIATUS, new species.

Distinguished at once from nearly all species of this genus by the absence of the longitudinal mesopleural furrow.

*Male*.—Length, 2.2 mm. Face, vertex, and temples closely sharply punctate and opaque; antennae missing beyond the eleventh segment, but apparently of normal length; mesoscutum and scutellum very coarsely confluent punctate and dull; the scutellum convex; mesopleurae closely coarsely punctate anteriorly and below the non-crenu-



late longitudinal depression, smooth and highly polished above it; propodeum short, rather flat, rugulose, with a distinct median longitudinal carina; stigma and metacarpus of about equal length; radius perpendicular to anterior margin of stigma and much longer than first intercubitus; posterior femora rather large; inner spur of posterior tibiae a little longer than the outer and very nearly half as long as the metatarsus; abdomen shorter than the thorax; first dorsal abdominal plate broadest at base, narrowing strongly toward apex, where it is hardly half as broad as at base, about twice as long as broad at base, and finely rugulose and opaque; second dorsal plate triangular, as broad at base as first plate is broad at apex, twice as long down the middle and four times as broad at apex as broad at base, opaque, minutely granular on basal half, finely striate on the apical half; third tergite opaque and indistinctly alutaceous; remainder of dorsum of abdomen smooth and shining. Reddish-black; head, including antennae, reddish; thorax black, more or less dark reddish on the sides and on propodeum; tegulae testaceous; wings hyaline, veins and stigma yellowish to pale yellowish-brown; fore and middle legs pale testaceous, except extreme base of coxae, which is blackish; posterior coxae largely reddish-black; posterior femora, tibiae and tarsi deep reddish-testaceous, more or less infuscated; abdomen black, more or less tinged with dark red, especially the first and second tergites; the broad membranous margins along the two basal plates pale yellow; venter pale at extreme base, black beyond.

*Type locality*.—Texas.

*Type*.—Cat. No. 24008, U.S.N.M.

*Host*.—Unknown.

Described from one specimen labeled, "Texas, Belfrage." I have also seen one specimen in Doctor Brues's collection at Harvard University, from Austin, Texas.

#### 26. MICROPLITIS VARICOLOR Viereck.

*Microplitis varicolor* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1917 (1916), pp. 203, 204.

*Type*.—In the Connecticut Agricultural Experiment Station at New Haven.

Connecticut; Tennessee; Texas; Pennsylvania; Louisiana; District of Columbia; Michigan; Illinois; Alabama; New York; South Carolina; Canada.

*Hosts*.—*Cirphis unipuncta* Haworth; *Plathypena scabra* Fabricius.

The following notes, based upon the unique type, are given because the original description of the species consisted merely of the characterization in the key: Length, 2.3 mm. Face and vertex closely punctate and dull; mesoscutum and scutellum uniformly closely

punctate and opaque, the former only a little shining on the posterior angles: entire thorax rather strongly pilose; mesopleurae dull and punctate anteriorly and below, polished above: propodeum coarsely rugose, with a prominent median longitudinal carina; metacarpus as long as the stigma; radius hardly as long as first intercubitus; posterior coxae very short; spurs of posterior tibiae much less than half as long as metatarsus; abdomen shorter than thorax, slender at base, broad on the third tergite; first dorsal abdominal plate slender, narrowing strongly to apex, where it is much narrower than at base, coarsely punctato-rugulose, except the extreme apex, which is elevated and highly polished; second dorsal abdominal plate triangular, as broad at base as first plate is broad at apex, broadening to the lateral margins of abdomen posteriorly; second and following tergites smooth and polished. Black; antennae dark testaceous, the scape and pedicel paler; tegulae and wing-bases pale yellow; legs entirely yellow, except extreme base of posterior coxae, which is black, and the posterior tarsi, which are dusky; abdomen black, except the second and third tergites, which are testaceous, and the membranous margins along the first and second plates, which are pale yellow; venter of abdomen mostly yellow.

Besides the type, I have seen the following material of this species: In the National Collection there are five specimens, reared from *Cirphis unipuncta* by G. G. Ainslie, at Nashville, Tennessee, under Webster No. 11332C; five reared from "*Heliophila*, species" by R. A. Vickery, at Brownsville, Texas, under Webster Nos. 6451 and 6453; one specimen reared from *Cirphis*, at Schenectady, New York, by E. W. Searls; two reared by R. J. Kewley, at Columbia, South Carolina, from *Plathypena scabra*; one from the same host, reared at Nashville, Tennessee, by C. C. Hill; and collected specimens from Agricultural College, Michigan; Champaign, Illinois; Huntsville, Alabama; Washington, District of Columbia; Pennsylvania; Louisiana; and Canada. The Cornell Collection contains specimens from Caroline, Slaterville, Rock City, and Peru, New York; and Montreal, Canada.

27. *MICROPLITIS SCUTELLATUS*, new species.

Closely allied to *montanus*; but differs strikingly in the black tegulae, coxae and trochanters, in the wings being very slightly infumated, in the inner spur of posterior tibiae being distinctly a little shorter than the outer, and in having the disk of scutellum curiously pitted along the sides.

*Female*.—Length 3 mm. Head transverse; face, vertex and temples closely punctate and opaque; the face with a short median polished ridge just below the insertion of antennae; antennae about

as long as the body; the basal flagellar segments of antennae about equal; mesoscutum closely punctate, coarsely and deeply so in the shallow depression just before the posterior margin; disk of scutellum apparently a little longer than broad at base, with a pronounced pitted groove just inside the lateral margins, leaving the margins as sharp ridges, and setting off a smaller triangular elevated area within; mesopleurae closely punctate and dull anteriorly and below the longitudinal crenulate furrow, highly polished above it; propodeum coarsely rugoso-reticulate with a prominent median longitudinal carina; radius directed strongly outward, and very slightly longer than the first intercubitus; outer spur of posterior tibiae distinctly a little longer than the inner, and much less than half as long as the metatarsus; abdomen a little shorter than the thorax, narrow at base, very broad on the third segment; first dorsal abdominal plate slender, broadest at base, narrowing a little posteriorly, twice as long as broad at base, rugulose; remainder of dorsum of abdomen smooth and polished; membranous margins along the first plate very narrow, except on the apical third; hypopygium not attaining apex of abdomen; ovipositor sheaths subexserted, straight. Black; clypeus, mandibles, and antennae black; labrum blackish; palpi pale, except at base; tegulae black; wings weakly infumated, the veins and stigma dark brown, the latter indistinctly paler at base; all coxae, basal segment of trochanters, base of fore and middle femora, and base and lower edges of posterior femora, black; all tarsi dusky. abdomen entirely black above and below.

*Cocoon*.—3.5 mm. long; cylindrical; not ribbed; pale grayish-brown in color.

*Type locality*.—Missoula, Montana.

*Type*.—Cat. No. 24009, U.S.N.M.

*Host*.—Geometrid larva on alfalfa.

Described from one specimen reared from an almost mature geometrid larva feeding on alfalfa, by W. H. Larrimer. The parasitic larva emerged from its host and spun cocoon April 16, 1916; eight days later the adult issued.

28. *MICROPLITIS LATICINCTUS*, new species.

Nearest to *varicolor* Viereck, from which it differs in its larger size; in the first dorsal abdominal plate not narrowing so strongly to the apex; in the second plate not being triangular; in the hypopygium of the female distinctly extending beyond the apex of the last dorsal abdominal segment; and in the slightly shorter metacarpus.

*Female*.—Length 3.5 mm. Head large, rather broad behind the eyes; the entire face, the vertex, temples and cheeks closely confluent punctate and dull; antennae very long, decidedly longer than the body; mesoscutum very closely confluent punctate and opaque, with-

out parapsidal grooves; scutellum a little longer than broad at base, without distinct closely-placed punctures, dull; mesopleurae punctate and dull anteriorly and below the longitudinal crenulate furrow, very smooth and polished above it; propodeum coarsely rugoso-reticulate, with a median longitudinal carina; radius strongly tending outward, very slightly longer than first intercubitus; metacarpus very nearly as long as stigma; posterior coxae very short; inner spur of posterior tibiae a little longer than the outer and nearly half as long as the metatarsus; abdomen almost as long as the thorax; first dorsal abdominal plate slender, nearly parallel-sided, more than twice as long as broad at base, and a little narrower at apex than at base, finely rugulose, except for a polished line down the middle; membranous margins along the first plate very broad; second dorsal abdominal plate broad, extending entirely across abdomen, without membranous margins, and together with the following dorsal segments, smooth and polished; hypopygium large, extending prominently beyond apex of the last dorsal segment of abdomen; ovipositor slightly exerted. Black; head and thorax black; labrum, palpi, antennae mostly, tegulae and wing-bases, and the legs, except a small blackish spot on the outer face of posterior coxae at base, testaceous to reddish-testaceous; wings very slightly infumated, the veins and stigma brown, the latter with a distinct pale transparent spot in the membrane at base; abdomen with the first dorsal plate black; the membranous margins along this plate, and a broad band covering the second and third tergites, and part of the fourth, reddish-testaceous; apical tergites black; venter of the abdomen testaceous on the basal two-thirds, blackish beyond.

*Male*.—Essentially as in the female, except that the first dorsal abdominal plate is usually a little less roughened and more shining.

*Cocoons*.—5 mm. long; slender, attenuated at both ends; provided with several prominent longitudinal ridges; grayish-brown in color.

*Type locality*.—Oswego, New York.

*Type*.—Cat. No. 24001, U.S.N.M.

Described from one female labeled "Oswego, N. Y., July 17, 1896"; two males reared at the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts, from cocoons, but without locality data, and one male labeled "Champaign, Ill. 16331." I have seen some additional material of this species: In the National Museum there is one other specimen from the C. F. Baker Collection, which was taken in Alabama under No. 1967. The Cornell University Collection contains specimens from Slaterville, Caroline, McLean, and Rock City, New York; and St. Hilaire, Quebec, Canada. In the collection of the Boston Society of Natural History there is a single specimen taken by Mr. C. W. Johnson at Chester, Massachusetts; and in material

from the collection of the American Museum of Natural History I have seen specimens from Hornerstown, Forest Lawn, and Nyack, New York.

29. *MICROPLITIS CONFUSUS*, new species.

Closely resembles *lewleyi* in size and general appearance, and in the cocoons. It differs from that species in the first abdominal plate being distinctly no broader at apex than at base, and more rugulose, also in having usually a conspicuous testaceous band across the abdomen covering the 2nd and 3rd tergites.

*Female*.—Length, 2.3 mm. Face, vertex, temples, cheeks entirely confluent punctate and dull; antennae a little shorter than the body; mesoscutum, like the head, confluent punctate, except for a narrow, transverse, slightly elevated line along the posterior margin; parapsidal grooves wanting; scutellum small, flat, very weakly punctate, shining; mesopleurae mostly highly polished, with a longitudinal crenulate furrow below; propodeum coarsely rugose, with a median longitudinal carina; fore wings rather narrow; stigma large, much longer than the metacarpus; radius short, hardly as long as the first transverse cubitus, sometimes distinctly shorter; hind coxae finely granular at base; hind tibial spurs much less than half as long as the metatarsus; abdomen a little shorter than thorax, narrow at base, broad and much depressed posteriorly; the first dorsal plate nearly parallel-sided, the sides bulging slightly a little beyond the middle, base and apex apparently of equal breadth, mostly finely rugulose or ruguloso-striate; second tergite not distinctly separated from the third, and like the following segments, smooth and polished; hypopygium not surpassing the apex of the last dorsal segment; ovipositor hardly exerted. Black; head and thorax black; labrum and palpi testaceous; basal three-fourths of antennae testaceous to brownish, apical fourth usually fuscous; tegulae and the wing bases, and the four anterior legs, pale; posterior coxae blackish; the hind femora, hind tibiae except base, and the hind tarsi, usually more or less infuscated; wings hyaline, veins and stigma light brown, the latter with a large transparent spot at base; abdomen black, with the second tergite and most of the third usually reddish-testaceous, the broad membranous margins along the apical third of the first plate dingy yellowish; venter of abdomen yellowish on basal half, blackish beyond.

*Male*.—Like the female except for the longer antennae and the darker second and third abdominal tergites.

*Cocoons*.—2.5 mm. long; light brown, not fluted, and with a very small amount of loose silk; gregarious.

*Type locality*.—Port Huron, Michigan.

*Type*.—Cat. No. 23999, U.S.N.M.

*Host.*—Cutworms.

Described from nineteen specimens reared from a cutworm, at Port Huron, Michigan, July 3, 1916, by J. J. Davis, in the Bureau of Entomology, under Cage No. D 498.

In addition to the type series the National Collection contains the following material of this species: Five specimens, with cocoons, reared from a cutworm, at Lafayette, Indiana, in the Bureau of Entomology, under Cage No. C 1371-a; five specimens from Hagerstown, Maryland, W. E. Pennington, Collector, bearing Accession No. 2463; one specimen labeled "Texas, Belfrage"; and three specimens from the Collection of C. F. Baker bearing the following numbers: Cana. 2051, Cana. 2027, and Cana. 2540. I have also seen, in the Cornell University Collection, specimens from McLean and Rock City, New York; and Waubamic, Ontario, Canada.

**30. MICROPLITIS BRADLEYI, new species.**

Very similar to *brassicae*, from which it is readily separated, however, by the somewhat roughened first dorsal abdominal plate, by the rugulose and opaque face, and by the yellow fore and middle coxae.

*Female.*—Length 2.5 mm. Face rather coarsely ruguloso-punctate and opaque, the clypeus somewhat less so; antennae slender, about as long as the body; vertex, temples, and cheeks punctate and dull, though a little less so than the face; mesoscutum confluent punctate and pilose; parapsidal furrows wanting; scutellum a little longer than broad at base, shallowly punctate, opaque, pubescent; mesopleurae confluent punctate and opaque anteriorly and below the longitudinal crenulate furrow, highly polished above it; propodeum coarsely rugoso-reticulate, with a median longitudinal carina; stigma large, a little longer than metacarpus; radius directed outward and about as long as the first intercubitus; legs slender; posterior coxae short, rather smooth and shining; spurs of posterior tibiae less than half as long as the metatarsus; abdomen ovate, narrow at base, broadening posteriorly; first dorsal abdominal plate very slender, distinctly narrower at apex than at base, and more than twice as long as broad at base, smooth and polished on basal half, finely rugulose on the apical half; second dorsal plate small, triangular, broadest posteriorly, and like the following tergites, smooth and polished; membranous margins along sides of the two basal abdominal plates very broad; hypopygium not surpassing apex of the last dorsal segment; ovipositor subexserted. Black; labrum and palpi pale; tegulae and wing-bases testaceous; wings hyaline, the costa yellow, the remaining veins pale brownish to hyaline, the stigma light brown, with a large transparent spot in the membrane at base, legs yellowish, except the posterior coxae, which are black, and the apex of the posterior femora



and tibiae and the posterior tarsi, which are dusky; abdomen black except the membranous margins along the two basal plates, which are yellowish-brown.

*Type locality*.—Sugar Pine, Madera County, California.

*Type*.—Cat. No. 564, Cornell University Collection.

Described from twenty-six female specimens collected by Dr. J. C. Bradley, at Sugar Pine, Madera County, California, 4,300–5,000 feet, August 24–31, 1914.

### 31. MICROPLITIS MONTANUS, new species.

Allied to *varicolor*, from which it differs in the blackish abdomen, in the blackish or dark reddish hind coxae, in the first dorsal abdominal plate narrowing less strongly to apex, and in the rather well indicated parapsidal grooves.

*Female*.—Length 2.8 mm. Head transverse, though rather full behind the eyes; face, except clypeus, which is indistinctly punctate and shining, vertex, and temples, minutely closely punctate and opaque; antennae hardly as long as the body; mesoscutum and scutellum shallowly confluent punctate and opaque, strongly pubescent; parapsidal grooves rather well indicated; mesopleurae closely punctate and dull anteriorly and below the deep crenate longitudinal furrow, highly polished above it; propodeum coarsely rugoso-reticulate, with a prominent median longitudinal carina, more shining than the mesonotum; radius tending outward, and very little, or not at all, longer than the first intercubitus; posterior coxae short, granular at base above; spurs of posterior tibiae apparently equal in length and much less than half the length of the metatarsus; abdomen a little shorter than the thorax, very slender at base, broader posteriorly; first dorsal abdominal plate very slender, more than twice as long as its greatest breadth, distinctly a little narrower at apex than at base, the sides bulging slightly somewhat before the apex, finely rugulose, the extreme apex elevated and highly polished; second plate broad, not triangular, not distinctly separated from the third, and like the following tergites, smooth and polished; hypopygium not attaining apex of the abdomen; ovipositor not exerted. Black; head and thorax black; labrum, palpi, tegulae and wing-bases, and the four anterior legs, yellow; posterior coxae largely dark reddish to blackish; posterior femora fuscous on apical third; posterior tibiae at apex, and the posterior tarsi, infuscated; wings hyaline, the veins and stigma yellowish-brown, the latter with a pale spot at base; abdomen black, more or less tinged with dark reddish at base; membranous margins along the first dorsal abdominal plate dingy yellowish-brown; venter of abdomen entirely blackish.

*Male*.—Essentially as in the female.

*Cocoons*.—3.5 mm. in length; somewhat irregularly ribbed; grayish-brown in color and covered with a little pale grayish silk; gregarious.

*Type locality*.—Santa Cruz Mountains, California.

*Type*.—Cat. No. 24010, U.S.N.M.

*Host*.—*Catocala verilliana* Grote.

Described from eight female and one male specimens, reared from *Catocala verilliana* Grote, in the Bureau of Entomology, under No. 538-o.

### 32. MICROPLITIS MATURUS Weed.

*Microplitis maturus* WEED, Trans. Amer. Ent. Soc., vol. 15, 1888, p. 294.

*Microplitis cincta* ASHMEAD, Canad. Ent., vol. 23, 1891, p. 3.

*Microgaster tuckeri* VIERECK, Trans. Kansas Acad. Sci., vol. 19, 1905, p. 274.

*Type*.—In the Philadelphia Academy of Sciences; type of *cincta* in the United States National Museum; type of *tuckeri* in the University of Kansas.

New York; Connecticut; Michigan; Kansas; Vermont; Maryland; Illinois; Florida; Georgia; New Jersey; South Dakota; Canada.

*Host*.—*Drasteria*, species; "geometrid larva."

*Cocoon*.—4 mm. in length; cylindrical; not ribbed; pale brown in color; solitary.

There can be no question, I believe, that *cincta* Ashmead and *tuckeri* Viereck belong here. Notes made by Mr. Gahan on an examination of the type of *tuckeri* show beyond dispute that this species is *maturus*.

In addition to the types of *maturus* and *cincta* I have seen the following material: The National Collection contains many specimens from the following localities: Long Island; Ottawa, Canada; Stowe, Vermont; Hagerstown, Maryland; Elk Point, South Dakota (reared from a geometrid larva by C. N. Ainslie); Algonquin, Illinois; Agricultural College, Michigan; Jacksonville, Florida; Tifton, Georgia; Brookings, South Dakota; Anglesea, New Jersey; and Riley County, Kansas; several specimens, from Hagerstown, Maryland, are recorded as reared from *Drasteria*, species. In the Cornell University Collection there are specimens from Waterville and Ithaca, New York, and Coniston, Ontario, Canada.

### HOSTS OF THE MICROGASTERINAE INCLUDED IN THIS PAPER.

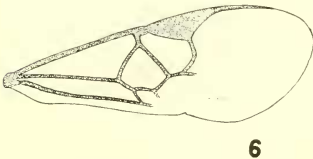
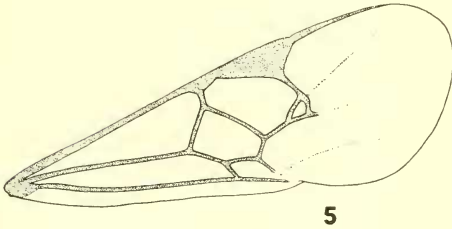
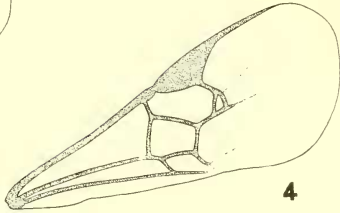
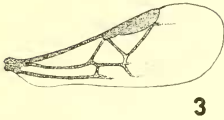
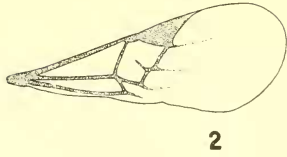
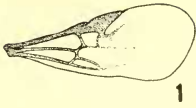
<i>Achatodes zcae</i> Harris.....	<i>Microplitis gortynae</i> Riley.
<i>Acromycta hasta</i> Guenée.....	<i>Microplitis hyphantriac</i> Ashmead.
<i>Alypia octomaculata</i> Fabricius.....	<i>Apanteles alypiæ</i> Muesebeck.
<i>Ancylistis comptana</i> Froelich.....	<i>Microgaster comptanæ</i> Viereck.
<i>Apatela furcifera</i> Guenée.....	<i>Microplitis hyphantriac</i> Ashmead.
<i>Arsilonche alborcnosa</i> Goeze.....	<i>Microplitis quadridentatus</i> Provancher.
<i>Aspidisca splendoriferella</i> Clemens.....	<i>Mirax aspidiscæ</i> Ashmead.
<i>Autographa brassicæ</i> Riley.....	<i>Microplitis brassicæ</i> Muesebeck.

<i>Autographa californica</i> Speyer	.....	<i>Microplitis ataskensis</i> Ashmead.
<i>Canarsia hammondi</i> Riley	.....	<i>Microgaster eclytolophae</i> Muesebeck.
<i>Catocala verrilliana</i> Grote	.....	<i>Microplitis montanus</i> Muesebeck.
<i>Ceratonia amyntor</i> Geyer	.....	<i>Microplitis ceratomiae</i> Riley.
<i>Chloridea virescens</i> Fabricius	.....	<i>Microplitis croceipes</i> Cresson.
<i>Cirphis unipuncta</i> Haworth	.....	<i>Microplitis melianae</i> Viereck; <i>vari-</i> <i>color</i> Viereck.
<i>Diatraca</i> , species	.....	<i>Microplitis harnedi</i> Muesebeck.
<i>Drasteria</i> , species	.....	<i>Microplitis maturus</i> Weed.
<i>Ecdytolopha insiticiana</i> Zeller	.....	<i>Microgaster eclytolophae</i> Muesebeck.
<i>Ectoedemia castancae</i> Busck	.....	<i>Mirax ectoedemiae</i> Rohwer.
<i>Ectoedemia phloeophaga</i> Busck	.....	<i>Acoeluis fasciipennis</i> Rohwer.
<i>Epagoge sulfureana</i> Clemens	.....	<i>Microgaster epagoges</i> Gahan.
<i>Euxoa</i> , species	.....	<i>Microplitis kewleyi</i> Muesebeck.
<i>Feltia annexa</i> Treitschke	.....	<i>Microplitis feltiae</i> Muesebeck.
<i>Feltia gladiaria</i> Morrison	.....	<i>Microplitis feltiae</i> Muesebeck.
<i>Gelechia cercerisella</i> Chambers	.....	<i>Microgaster pantographae</i> Muesebeck.
(?) <i>Gelechia</i> , species	.....	<i>Microgaster eclytolophae</i> Muesebeck.
<i>Gnorimoschema gallaesolidaginis</i> Riley	.....	<i>Microgaster gelechiaae</i> Riley.
<i>Grapholitha prunivora</i> Walsh	.....	<i>Mirax aspidisciae</i> Ashmead.
<i>Hadena procincta</i> Grote	.....	<i>Microplitis ataskensis</i> Ashmead.
<i>Heliothis obsoleta</i> Fabricius	.....	<i>Microplitis croceipes</i> Cresson.
<i>Hydroccea immanis</i> Grote	.....	<i>Microplitis gortynae</i> Riley.
<i>Hyphantria cunea</i> Drury	.....	<i>Microplitis hyphantriae</i> Ashmead.
<i>Lithocolletes aceriella</i> Clemens	.....	<i>Mirax lithocolletidis</i> Ashmead.
<i>Mamestra picta</i> Harris	.....	<i>Microplitis mamestrae</i> Weed.
<i>Melitara junctolinella</i> Hulst	.....	<i>Apanteles minoristae</i> Muesebeck.
<i>Mimorista flavidissimalis</i> Grote	.....	<i>Apanteles mimoristae</i> Muesebeck.
<i>Nelecucania albilinea</i> Hübner	.....	<i>Microgaster auripes</i> Provancher; <i>Micro-</i> <i>plitis melianae</i> Viereck.
<i>Noctua</i> , species	.....	<i>Microplitis coactus</i> Lundbeck.
<i>Olene ragans</i> Barnes and McDunnough	.....	<i>Apanteles olenidis</i> Muesebeck.
<i>Pantographa limata</i> Grote & Robinson	.....	<i>Microgaster pantographae</i> Muesebeck.
<i>Paonias caccatus</i> Smith and Abbot	.....	<i>Microplitis ceratomiae</i> Riley.
<i>Papaipema nebris</i> Guenée	.....	<i>Microplitis gortynae</i> Riley.
<i>Perigea sutor</i> Guenée	.....	<i>Microgaster calliptera</i> Say.
<i>Phlyetaenia ferrugalis</i> Hübner	.....	<i>Microgaster phthorimaeae</i> Muesebeck.
<i>Phthorimaea operculella</i> Zeller	.....	<i>Microgaster phthorimaeae</i> Muesebeck.
<i>Physoclesia</i> , species	.....	<i>Microgaster congregatiformis</i> Viereck.
<i>Plathypena scabra</i> Fabricius	.....	<i>Microgaster facetosa</i> Weed; <i>Micro-</i> <i>plitis varicolor</i> Viereck.
<i>Platysenta videns</i> Guenée	.....	<i>Microgaster calliptera</i> Say.
<i>Plusia</i> , species	.....	<i>Microplitis ataskensis</i> Ashmead.
<i>Plutella maculipennis</i> Curtis	.....	<i>Microplitis plutellae</i> Muesebeck.
<i>Recurvaria piccaella</i> Kearfott	.....	<i>Microgaster zonaria</i> Say.
<i>Recurvaria thujaella</i> Kearfott	.....	<i>Microgaster zonaria</i> Say.
<i>Schizura concinna</i> Smith and Abbot	.....	<i>Microgaster schizurae</i> Muesebeck.
<i>Schizura unicornis</i> Smith and Abbot	.....	<i>Microgaster schizurae</i> Muesebeck.
<i>Sphinx drupiferarum</i> Smith and Abbot	.....	<i>Microplitis ceratomiae</i> Riley.
<i>Sphinx gordius</i> Cramer	.....	<i>Microplitis ceratomiae</i> Riley.
<i>Swammerdamia castaneae</i> Busck	.....	<i>Microgaster swammerdamiae</i> Muese- beck.
<i>Vanessa atalanta</i> Linnaeus	.....	<i>Microgaster carinata</i> Packard.
<i>Xylina</i> , species	.....	<i>Microplitis hyphantriae</i> Ashmead.

EXPLANATION OF PLATE.

- FIG. 1. Fore wing of *Elasmosoma vigilans* Cockerell.  
2. Fore wing of *Mirax ectoedemiac* (Rohwer).  
3. Fore wing of *Adelius fasciipennis* (Rohwer).  
4. Fore wing of *Microplitis ceratoniae* Riley.  
5. Fore wing of *Microgaster gelechiac* Riley.  
6. Fore wing of *Apanteles congregatus* Say.

NOTE.—These figures are intended to show only venation. No attempt has been made to indicate infuscated areas, or the arrangement of setae.



NORTH AMERICAN ICHNEUMON-FLIES.

FOR EXPLANATION OF PLATE SEE PAGE 74.

